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THE RÔLE OF PHARMACOLOGY IN THE DEVELOPMENT OF IDEAL ANESTHESIA

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Since no drug is quite ideal for its purpose, stimulus exists for commercial as well as scientific efforts to develop better drugs than any now in use for a particular clinical effect. Scientifically, such an effort is usually based on some phase of what may be called biochemorphology,[1] i. e., the relation between chemical constitution and biologic action. A chemist, after considering, for instance, the biochemorphic aspects of hypnotics, synthesizes a new substance, which is found to have hypnotic action. Commercially there now comes a strong temptation to introduce the new agent clinically without furnishing physicians sufficient comparative scientific data to enable them to judge whether or not it has advantages recommending it over hypnotics already in common use. One would be naive indeed to believe that the pharmaceutic concern developing the new hypnotic could give unbiased judgment on this point. But it is thus that the hopeful good humor of physicians is too often exploited with unnecessary harm or expense to their patients.

Four years ago, before the Portland session of the American Medical Association, I tried to outline in a general way the position of pharmacology in the appraisal of drugs suggested for general use in medicine.[2] It was pointed out that clinical trial of a new chemical should be made only after disinterested pharmacologic study has estimated in comparison with related agents (*a*) its possible harmful effects, (*b*) its type or mode of action and (*c*) the reasonableness of its replacing existing drugs in application to human beings. It was further indicated that the new agent should not be offered for general use to physicians until favorable reports on it had been published from reliable chemical, pharmacologic and clinical sources. Pharmacologic data are more readily accepted from university laboratories than from commercial laboratories, and clinical information is usually relied on when it comes from a university or independent research hospital. Physicians might place greater confidence in commercial concerns if they would cooperate with such institutions rather than supplant them with their own. While it is to be hoped that Sir Henry Dale's pious good wishes for American pharmaceutic houses may come true,[3] past experience indicates that American physicians must support more fully the judgment of the Council on Pharmacy and Chemistry of the American Medical Association and insist more strongly on adequate and reliable pharmacologic and clinical data in connection with new drugs if they are to free themselves from exploitation. One need only think of the current situation in local anesthesia and preanesthetic medication to realize the significance of these remarks. It is yet to be satisfactorily demonstrated, not only pharmacologically and clinically but also from the standpoint of expense, that for infiltration and spinal anesthesia or nerve block a better local anesthetic is available than procaine, that any of the many modifications of barbital surpass it for ordinary preanesthetic hypnosis,[4] or that tribrom-ethanol ("Avertin") is better than paraldehyde for rectal narcosis.[5]

RATIO OF TOXICITY TO EFFICIENCY

In the pharmacologic evaluation of new chemicals for various uses in anesthesia as elsewhere, the essential proposition is the critical quantitative estimation of the ratio of the toxicity of the substance to its efficiency in comparison with related agents. Both the toxicity and the efficiency must be thoroughly investigated. It is not enough to estimate an average lethal dose (M. L. D.). This gives no information regarding the minimal dosage, either single or total cumulative, at which harmful effects may be encountered in the susceptible organism, which in the case of the human being is just the one to protect. For some drugs the toxic dose range is wider than for others because there may be a greater individual variation in response to it.[6] The physician should have this full information. If the toxic dose range overlaps the effective dose range, the drug is not a safe one. In appraising a series of drugs giving a satisfactorily intense and prolonged effect, the one that has the greatest margin of safety between the effective dose range and the toxic dose range will be best in general. Too seldom are full data on this essential matter in anesthesia given to physicians.

Some of these propositions may be illustrated to advantage in connection with problems of current

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1. The adjective "biochemorphic" has been coined to connote "that pertaining to the relationship between chemical constitution (including physical properties) and pharmacologic (physiologic or biologic) action." Such a term is badly needed, especially when the restricted term "chemotherapy" (Ehrlich) is becoming loosely employed to cover this whole field (e. g., Dyson, G. M.: The Chemistry of Chemotherapy, London, 1928). The noun indicating "the study of the relationship between chemical constitution and biologic activity" would be "biochemorphology." The literal meaning of the term, "knowledge of living chemical structure," really implies the fundamental objective of investigations on the relationships between chemical constitution and biologic activity, so that there is no essential conflict with its technical meaning.

2. Leake, C. D.: The Pharmacologic Evaluation of New Drugs, J. A. M. A. **93**: 1632 (Nov. 23) 1929.

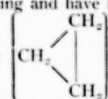
3. Dale, H. H.: Academic and Industrial Research in the Field of Therapeutics, Science **77**: 521 (June 2) 1933.

4. Leake, C. D.: Some Pharmacologic Aspects of Preanesthetic Medication, Northwest Med. **29**: 561 (Dec.) 1930. Grabfield, G. P.: Observations on the Efficiency of Commonly Used Hypnotics, J. A. M. A. **96**: 1865 (May 30) 1931.

5. Stewart, J. D.: Rectal Paraldehyde Before Operation, Brit. M. J. **2**: 1139 (Dec. 24) 1932.

6. Burn, J. H.: Errors of Biological Assay, Physiol. Rev. **10**: 146 (Jan.) 1930.

28472

interest in anesthesia. For general inhalation anesthesia, although a number of substances are commonly used, not one is ideal. Partly by accident [7] and partly by deliberation,[8] the anesthetic properties of the unsaturated hydrocarbon ethylene ($CH_2=CH_2$) were rediscovered in 1922, although they were known to Richardson fifty years before.[9] This revived interest in the search for better general anesthetics, since ethylene, in spite of its explosibility, was found to have many physiologic advantages over its competitors.[10] It was found that further unsaturation, as in acetylene ($CH\equiv CH$), or increasing the number of carbon atoms, as in propylene ($CH_2-CH=CH_2$), does not seem to improve the anesthetic qualities but may introduce undesirable ones. The careful studies of Prof. V. E. Henderson and his associates on the cyclohydrocarbons, however, are most promising and have led to the demonstration of cyclopropane  as a relatively nontoxic and powerful inhalation anesthetic worthy of clinical trial.[11] Rather than discuss this, I hope I may be pardoned for the seeming egotism of using as an illustration work with which I am more directly familiar.

DIVINYL OXIDE AND VINYL CHLORIDE

A consideration of the biochemorphic aspects of general anesthetics led to the prediction that a compound incorporating the structural characteristics of ether ($CH_3-CH_2-O-CH_2-CH_3$) and ethylene ($CH_2=CH_2$) would be a general anesthetic, and further that this unsaturated ether ($CH_2=CH-O-CH=CH_2$, divinyl oxide) would be better than any unsaturated ether with a greater number of carbon atoms in the side chains. When this prediction was made, divinyl oxide, although theoretically known to chemists, did not exist. When I requested this specific compound with other unsaturated ethers from Prof. Lauder Jones of Princeton University, his associates, Drs. Randolph Major and W. T. Ruigh, sent me an impure sample, which was found, however, to have the properties predicted of it.[12] Later Drs. Major and Ruigh [13] became associated with the Laboratory of Pure Research of Merck & Co. and prepared for the first time pure divinyl oxide, which they were kind enough to furnish in amounts large enough for pharmacologic study and later for clinical trial when its advantages had been demonstrated.[14] Pure divinyl oxide, although explosive like ether and ethylene, is more powerful and rapid in its anesthetic action. It is more volatile than ether (boiling point 28.3 C.) and less irritating locally, and its general physiologic effects are less severe. It has no significant pathologic effect when administered without anoxemia. Its minimal certain anesthetic concentration, like ether, is about one-third its minimal toxic concentration when allowed to act for ten minutes, but greater circulatory reserve remains when respiration fails. Recovery is more prompt than from ether or ethylene and less attended with nausea or other complications. A great practical advantage revealed by animal experimentation is that abdominal relaxation, without intercostal muscular paralysis, may more easily be obtained with divinyl oxide than with other common general anesthetics. Following our pharmacologic studies, Gelfan and Bell [15] of the University of Alberta demonstrated its safety in anesthetic concentrations for man. At its first surgical use with Dr. Dorothy Wood as anesthetist at the University of California Hospital, San Francisco, in an operation on an obese patient for removal of the gallbladder, its practical advantages were clearly evident. These have now been independently confirmed.[16]

But divinyl oxide is not, of course, an ideal inhalation anesthetic. In addition to its explosibility and probable expense, it may polymerize or decompose with the appearance of such dangerous irritants as formaldehyde and formic acid. Difficulty with such impurities has already been experienced.[17] But so far results justify the hope that similar biochemorphic studies may lead more closely to an ideal general anesthetic.

Further steps in this direction are being taken in our laboratory. Dr. S. A. Peoples is investigating the anesthetic properties of the halogenated unsaturated hydrocarbons. These were suggested by the fact that the union of a halogen with an unsaturated carbon atom is more stable than otherwise, so that such compounds might not be expected to decompose in the body, causing untoward effects, as seems to be the case with saturated halogenated hydrocarbons.[18] Vinyl chloride ($CH_2=CHCl$), which may most appropriately be compared to ethyl chloride (CH_3-CH_2Cl), is a gas (boiling point — 13.9 C.) heavier than air and with an ethereal odor. Its narcotic action has already been noted.[19] Dr. Peoples [20] found that, although it is not quite as powerfully anesthetic as ethyl chloride, it has a wider margin of safety between its anesthetic range and its toxic range. It is very rapid in its action and recovery from it is prompt with no apparent untoward effects, even after prolonged anesthetization. It is, of course, much more powerful than ethylene as a general anesthetic, and significantly it is not explosive. It is also very cheap. The chlorine in it is split off only with difficulty, so that physiologically it seems relatively free from many of the untoward effects of ethyl chloride. It remains for further pharmacologic study to indicate whether or not it is worthy of use in human beings. Dr. Peoples is also studying higher halogenated unsaturated hydrocarbons, such as β-brompropylene ($CH_3-CBr=CH_2$), which are nonexplosive and powerful anesthetics.

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8. Brown, W. E., and Henderson, V. E.: On Ethylene as an Anesthetic, Arch. internat. de pharmacodyn. et de therap. **28**: 257, 1923.

9. Richardson, B. W.: A Synopsis of Anesthetics, Scient. Am. (supplement) **20**: 8227, 8240, 1885.

10. Luckhardt, A. B., and Lewis, Dean: Clinical Experiences with Ethylene-Oxygen Anesthesia, J. A. M. A. **81**: 1851 (Dec. 1) 1923. Leake, C. D.: The Effect of Ethylene-Oxygen Anesthesia on the Acid-Base Balance of Blood: A Comparison with Other Anesthetics, J. A. M. A. **83**: 2062 (Dec. 27) 1924.

11. Henderson, V. E., and Lucas, G. H. W.: Cyclopropane, a New Anesthetic, Anesth & Analg. **9**: 1 (Jan.-Feb.) 1930; The Effect of Cyclopropane on Metabolism, Arch. internat. de pharmacodyn. et de therap. **37**: 155, 1930. Henderson, V. E., and Johnston, J. F. A.: Anesthetic Potency in the Cyclohydrocarbon Series, J. Pharmacol. & Exper. Therap. **43**: 89 (Sept.) 1931.

12. Leake, C. D., and Chen, M. Y.: Anesthetic Properties of Certain Unsaturated Ethers, Proc. Soc. Exper. Biol. & Med. **28**: 151 (Nov.) 1930.

13. Ruigh, W. L., and Major, R. T.: Preparation and Properties of Pure Divinyl Ether, J. Am. Chem. Soc. **53**: 2662 (July) 1931.

14. Leake, C. D.; Knoefel, P. K., and Guedel, A. E.: Anesthetic Action of Divinyl Oxide in Animals, J. Pharmacol & Exper. Therap. **47**: 5 (Jan.) 1933.

15. Gelfan, S., and Bell, I. R.: Anesthetic Action of Divinyl Oxide on Humans, J. Pharmacol. & Exper. Therap. **47**: 1 (Jan.) 1933.

16. Geldschmidt, Samuel; Raydin, I. S.; Locke, Baldwin; Muller, G. P., and Johnston, C. G.: Divinyl Ether: Experimental and Clinical Studies, J. A. M. A., this issue, p. 21.

17. Waters, R. M., and Guedel, A. E.: Independent personal communication to the author.

18. Lucas, G. H. W.: Fate and Toxicity of Bromine and Chlorine Containing Anesthetics, J. Pharmacol. & Exper. Therap. **34**: 223 (Oct.) 1928.

19. Patty, F. A.; Yant, W. P., and Waite, C. P.: Acute Response of Guinea-Pigs to Vapors of Some New Commercial Organic Compounds: V. Vinyl Chloride, Pub. Health Rep. **45**: 1963 (Aug. 22) 1930.

20. Peoples, S. A., and Leake, C. D.: Anesthetic Action of Vinyl Chloride, J. Pharmacol. & Exper. Therap., to be published.

IMPORTANCE OF TECHNIC

Biochemorphic studies, such as those of Prof. V. E. Henderson's on the cyclohydrocarbons and those on unsaturated hydrocarbons, illustrate the rôle pharmacology may play in the development of ideal inhalation anesthetics. Technic is another phase of the pharmacologic evaluation of anesthetics which may aid in achieving ideal anesthesia. In our studies on divinyl oxide we had occasion to examine critically various methods of administering inhalation agents. No method in our opinion is as sound physiologically, as reflected in the anesthetic and postanesthetic condition of the organism, as the Waters [21] carbon dioxide filtration technic. In our experimental work we found that such complicating factors in general anesthesia as water or heat loss from the lungs, asphyxiation, anoxemia and carbon dioxide accumulation can be reduced to a minimum by this method. Furthermore, it minimizes loss or waste of anesthetic and permits very accurate control. In this study we were impressed again with the importance of anoxemia as a factor in the deleterious physiologic effects of a general anesthetic. These considerations are more significant clinically when human life is at stake than experimentally. Pharmacology may thus be helpful in evaluating anesthetic technic. This is now so complex, involving so many difficult physiologic and pharmacologic propositions, that it must be obvious that anesthesia is a medical specialty worthy of the best attention of able physicians, and that it can no longer be entrusted to individuals with inadequate medical training without denying surgical patients the skill they deserve.

CHEMICAL ADJUNCTS TO ANESTHESIA

A great variety of chemical adjuncts to anesthesia have been proposed for (*a*) preanesthetic hypnosis, (*b*) regulation of metabolism preoperatively, (*c*) aid in the induction, maintenance and prompt recovery from direct anesthesia, (*d*) relief of postanesthetic nausea, and (*e*) postoperative analgesia. Reference to pharmacology in this overgrown field would greatly help in approaching more ideal conditions than those now existing, especially regarding preanesthetic hypnotics. It should be clinically obvious that routine preanesthetic medication or use of chemical adjuncts to anesthesia is not in the best interests of the patient. Each patient should be individually considered with regard to the chemical to be used, if necessary at all, and its dosage and mode of administration. Axiomatic though this may be, it is usually honored in the breach in anesthesia.

Pharmacologic evidence indicates that much traditional rubbish in common beliefs regarding morphine, atropine and scopolamine (hyoscine) might be removed with advantage to anesthetic practice. The objections to morphine are central nervous system stimulation outlasting the obvious depression, tendency to cause constipation, tendency to disturb carbohydrate and fat metabolism, depression of respiration and interference with rapidity of absorption and excretion of a volatile anesthetic.[22] Nevertheless, it remains the best preanesthetic hypnotic and postoperative analgesic when traumatic pain is present. Codeine is preferable if the traumatic pain is slight. It is to be hoped that the thorough biochemorphic studies of Small and Eddy may lead to the discovery of an ideal agent in this regard.[23] In congestive pain, amidopyrine or a similar acting antipyretic which seems to restore fluid from tissues to blood [24] may be recommended as a substitute. Little rational evidence exists that opium or a mixture of its alkaloids free from nonalkaloidal material ("pantopon") has any advantage over morphine as a preanesthetic hypnotic: indeed, the evidence is otherwise.[25] Atropine has rational indications when chloroform or ethyl chloride are to be used or when an embarrassing mucous or salivary flow is expected. Otherwise it has little merit in anesthesia, its relaxation of the intestine probably contributing to the frequent postoperative stasis. What critical pharmacologic or chemical information is available regarding scopolamine fails to justify its use in anesthesia.[26] Since it is chemically related to atropine, it may be expected to have actions and disadvantages similar to the latter.

Current interest in preanesthetic hypnotics is focused on the barbiturates, to the unfortunate neglect of many other equally promising chemical types. On pharmacologic evidence from normal human beings, barbital by mouth may be recommended as a suitable preanesthetic hypnotic if no pain is present.[27] Although commercial rivalry has produced an amazing number of modifications of barbital, satisfactory evidence is still lacking to show the undoubted superiority of any of them over barbital. The biochemorphology of this group of drugs has been well reviewed by Shonle.[28] As an example of gross commercial exploitation in this field, combinations of barbiturates in fixed proportions with amidopyrine ("allonal," "cibalgin," "pyraminal") may be mentioned. In spite of direct pharmacologic evidence of the danger of such mixtures,[29] since the analgesic component is excreted more rapidly than the hypnotic, so that cumulative barbital poisoning is possible on repeated administration, they remain "successful." Similarly, the "success" of tribrom-ethanol as a "basal anesthetic" is chiefly commercial, pharmacologic and clinical evidence failing as yet to indicate that it is any better than paraldehyde by rectum.[5]

My destructive criticism should not lead to a loss of hope that hypnotics more satisfactory than those commonly used now may not be found. The principles of biochemorphology may be expected to advance our knowledge to this end if they may be patiently and steadfastly pursued without the pressure of business expediency. Dr. P. K. Knoefel [30] in our laboratory has made some interesting studies on the paraldehyde series which may be of practical significance.

Many hypnotics of different chemical types, which may be used as basal narcotics, seem to inhibit the gen-

21. Waters, R. M.: Carbon Dioxide Absorption from Anesthetic Mixtures, California & West. Med. **35**: 342 (Nov.) 1931.

22. Herb, Isabella C.: Administration of General Anesthetics with Special Reference to Ether and Chloroform, J. A. M. A. **56**: 1312 (May 6) 1911. Gatch, W. D.: The Use of Rebreathing in the Administration of Anesthetics, ibid. **57**: 1599 (Nov. 11) 1911. Bevan, A. D.: The Choice of the Anesthetic, ibid. **57**: 1821 (Dec. 2) 1911. Leake, C. D.: Chemical Adjuncts to General Anesthesia, California & West. Med. **33**: 714 (Oct.) 1930.

23. Eddy, N. B.: Studies of Morphine, Codeine and Their Derivatives, J. Pharmacol. & Exper. Therap. **45**: 339, 361 (July) 1932.

24. Barbour, H. G.: Heat Regulation and Water Exchange, J. Pharmacol. & Exper. Therap. **29**: 427 (Oct.) 1926; Physiol. Rev. **1**: 295 (April) 1921.

25. Barlow, O. W., and Stormont, M. F.: Premedication Values of Morphine, Codeine, Papaverine, Narcotine and Pantopon in Relation to Nitrous Oxide Anesthesia, J. Pharmacol. & Exper. Therap. **46**: 141 (Oct.) 1932.

26. Barlow, O. W.: Preanesthetic Value of Scopolamine and Mixtures of Scopolamine and Morphine in Relation to Nitrous Oxide Anesthesia in the Rat, J. Pharmacol. & Exper. Therap. **46**: 131 (Oct.) 1932.

27. Anderson, H. H.; Chen, M. Y., and Leake, C. D.: Possible Substitutes for Morphine in Preanesthetic Medication: Observations on Common Barbituric Acid Derivatives, J. Pharmacol. & Exper. Therap. **39**: 271 (July) 1930; Effects of Barbituric Acid Hypnotics on Basal Metabolism in Humans, ibid. **40**: 215 (Oct.) 1930.

28. Shonle, H. A.: Chemical Basis of Hypnotic Action as an Index of Clinical Efficiency, Anesth. & Analg. **11**: 210 (Sept.-Oct.) 1932.

29. Koppanyi, T., and Lieberson, A.: J. Pharmacol. & Exper. Therap. **39**: 177 (June) 1930.

30. Knoefel, P. K.; Lonergan, Lester, and Leake, C. D.: Biochemorphic Aspects of Paraldehyde and Certain Acetals, Proc. Soc. Exper. Biol. & Med. **29**: 730 (March) 1932.

eral hyperactivity of the sympathetic nervous system caused by ether, chloroform and other volatile anesthetics. Knoefel has suggested that their use, therefore, may be an important factor in counteracting suprarenal exhaustion and anesthetic shock.[30a] Pharmacologic study should indicate what hypnotics are best suited for this purpose.

In many other cases in which chemical adjuncts to anesthesia are used, as for respiratory or circulatory stimulation, disinterested critical pharmacologic evidence of the value of new drugs should be demanded before clinical trial is undertaken. The advances made by biochemorphic studies in the epinephrine series [31] justify the hope that their continuation may lead to more ideal agents in this group for adjunctive use in anesthesia than any now available.

LOCAL ANESTHETICS

As an example of sound critical pharmacologic evaluation along the lines I have suggested, the work of Sollmann [32] and of Schmitz and Loevenhart [33] in the procaine series of local anesthetics is outstanding. Here is a field in which biochemorphology has been used to produce such an abundant harvest that its pharmacologic evaluation, except in scattered instances, has scarcely begun.[34] Pending this necessary comparative pharmacologic appraisal, clinicians should be very cautious in using new local anesthetics on their patients. It is in this field especially that the ratio of toxicity to efficiency in comparison with related agents or with standard local anesthetics is most important. Fortunately, these comparative ratios may be accurately estimated by proper pharmacologic methods. Clinicians should insist that data of this sort be plainly and fully presented so that they may be the ones to judge of the worthiness of new substances for clinical uses. For surface (mucous membrane) anesthesia it is desirable that thorough study be made of local anesthetics in order to find such satisfactory substitutes for cocaine that there will not longer be any hesitancy in discarding completely this dangerous habit former. For infiltration or subarachnoid anesthesia or nerve block, procaine will be hard to surpass because of its unusually wide margin of safety between its effective and toxic doses.

In the quinine series there is the possibility that biochemorphic considerations may aid in the finding of relatively safe and efficient local anesthetics with prolonged action. Nupercaine is by no means ideal in this regard, but its development indicates the hope.[35] There is also the hope that prolongation of action may be achieved in the relatively safer procaine series by biochemorphic studies. But this desideratum may be attained by other methods suggested by pharmacologic observations. Absorption may be delayed by causing local vasoconstriction, as is commonly done by adding epinephrine to a local anesthetic solution. But this increases the toxicity of the local anesthetic, and substituting ampules of pitressin for epinephrine gives no advantage.[36] Biochemorphic considerations have suggested incorporating vasoconstricting and local anesthetic properties in a single chemical substance, and the recent synthesis of many such agents [37] offers the hope of advance in this direction toward more ideal local anesthesia. Some compounds being studied in our laboratory by Knoefel and Alles seem very promising.

Reduction of absorption by local vasoconstriction is also an important factor in minimizing systemic poisoning by local anesthetics. But the discovery of the prophylaxis of systemic local anesthetic toxicity by means of the barbitals and certain other hypnotics [38] is a practical pharmacologic contribution of greater significance in the development of ideal anesthesia, since it may be used to relieve the patient's fear and excitement as well as to protect against untoward reactions. The possibility of incorporating central nervous system depressant action with local anesthetic action in the same chemical has been proposed by Dr. Knoefel on biochemorphic grounds; his studies indicate definite hope in this direction.[39]

SUMMARY

In the development of ideal anesthesia, pharmacology must play a major rôle, particularly in the critical appraisal of the relative merits of new chemicals proposed for use in anesthesia. Significant advance may follow studies on the relation between chemical constitution and biologic action (biochemorphology). Such a possibility is already promised for inhalation anesthesia by observations on the cyclohydrocarbons, unsaturated ethers, and halogenated unsaturated hydrocarbons, and especially for preanesthetic hypnotics and local anesthetics by a variety of chemical types. Unfortunately, commercial considerations have largely dominated this field, so that proper pharmacologic data on new drugs, especially relating to toxicity and efficiency in comparison with related or commonly used agents, have not usually been furnished physicians to enable them to judge whether or not the new drugs are worthy of clinical use. Such data may advantageously be secured by cooperation with university medical laboratories. Loevenhart proposed a cooperative therapeutic institute for obtaining data of this sort under ideal conditions but unfortunately commercial houses were unwilling to establish and support it.[40]

ABSTRACT OF DISCUSSION

DR. M. H. SEEVERS, Madison, Wis.: When the time comes for the clinical trial of a new drug, even after extensive pharmacologic investigation with favorable results, one must proceed as cautiously as if one had little or no knowledge of the drug, because additional action, which did not manifest itself in the lower animals, may preclude its clinical use. A capable anesthetist, who has been in the foreground in the clinical trial of newer anesthetic agents, recently stated that he will not attempt to evaluate any new drug until it has had an extensive clinical application.

30a. Knoefel, P. K.: Nature of Anesthetic Shock and the Value of Premedication, California & West. Med. **29:** 344 (Nov.) 1933.

31. Chen, K. K., and Schmidt, C. F.: Ephedrine and Related Substances, Medicine **9:** 1 (Feb.) 1930. Hartung, W. H.: Epinephrine and Related Compounds, Influence of Structure on Physiological Activity, Chem. Rev. **9:** 389 (Dec.) 1931.

32. Sollmann, Torald: Comparative Activity of Local Anesthetics, J. Pharmacol. & Exper. Therap. **10:** 379 (Nov.) 1917; **11:** 1, 9, 17, 69 (Feb.) 1918; **13:** 429 (Aug.) 1919.

33. Schmitz, H. L., and Loevenhart, A. S.: Comparative Study of Local Anesthetics, J. Pharmacol. & Exper. Therap. **24:** 159, 167 (Sept.) 1924.

34. Hirschfelder, A. D., and Bieter, R. N.: Local Anesthetics, Physiol. Rev. **12:** 190 (April) 1932.

35. Uhlmann, F.: Percaine, Arch. internat. de pharmacodyn. et de therap. **36:** 253 1929. Wahl, C. C., and Knoefel, P. K.: Toxicity of Nupercaine, Proc. Soc. Exper. Biol. & Med. **29:** 368 (Jan.) 1932. Frequent sloughs at the site of infection are reported by numerous clinicians.

36. Knoefel, P. K.: Use of Pitressin in Local Anesthesia, Proc. Soc. Exper. Biol. & Med. **30:** 243 (Nov.) 1932.

37. Alles, G. A., and Knoefel, P. K.: Local Anesthetics with Vasopressor Activity, Arch. internat. pharmaco. therap., to be published.

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40. Loevenhart, A. S.: A Proposed Therapeutic Institute, Proc. Third Race Betterment Conference, Jan. 26, 1928, p. 489.

CEREBRAL CYSTS

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The clinical syndromes produced by intracranial lesions follow fairly definite lines of progression, and may indicate the underlying pathologic changes. However, it is reasonable to assume that a definite pathologic diagnosis can be made only at operation or necropsy. General and neurologic examinations may indicate whether the lesion is primary or secondary, inflammatory or neoplastic, and encephalography or ventriculography may be necessary to assist in localization.

When the lesion has been localized and found suitable for operation, it is important to determine whether it is cortical or subcortical, cystic or solid and neoplastic or non-neoplastic. Because of the difficulty in distinguishing between cerebral cysts at the time of operation, we have reviewed the various types for the purpose of comparison. Between 10 and 15 per cent of the surgical conditions of the brain were found to be cystic. This particular group of conditions involving the cerebral hemispheres has been considered with regard to etiology, and has been divided into congenital, inflammatory, traumatic, parasitic and neoplastic types.

Congenital cysts may be subdivided into porencephalic, epidermoid and simple. Porencephalic cysts either communicate with the subarachnoid space and the ventricle, or extend so deeply into the substance of the brain that they cause distortion of the ventricular outline. The walls of epidermoid cysts are lined with epithelium in which there are few glandular structures, and the contents are not fluid, but caseous. Among the cysts encountered at operation are subcortical cavities containing clear fluid, the walls of which are smooth and glistening and in which there is no evidence of neoplasm or inflammation. In the absence of a history of trauma or evidence of inflammation these have been designated congenital simple cysts.

Inflammatory cysts are rare and consist either of collections of fluid in the chronically inflamed piaarachnoid space, or subcortical collections of fluid associated with chronic encephalitis. There is usually little evidence that these cavities are the end-result of the liquefaction and absorption of a previous abscess.

Traumatic cysts may be divided into subdural hematomas, calcified, and simple cysts. It is questionable whether subdural hematomas should be included in this group because they occur between the dura mater and the cortex of the cerebrum. Calcified cysts are frequently the result of a subcortical hematoma, and are encountered at an age when spontaneous hemorrhages are not likely to occur. In addition to the congenital simple cysts, smooth-walled cysts have been encountered following a definite history of trauma; these contain clear fluid. In the walls of these cysts there is no evidence of neoplasm.

The most common parasitic cyst encountered at operation consists of the collection of fluid due to infestation by Echinococcus. These cysts may be solitary and frequently contain daughter and granddaughter cysts and may occur subcortically, or they may be attached to the meninges.

The neoplastic cyst is by far the most common type encountered at operation. It varies almost in direct proportion with the frequency with which various types of neoplasms occur in the cerebrum. Almost all types of tumors have been found associated with cysts, and the more benign and slow-growing types seem to have a greater tendency to degenerate and form cysts than the more rapidly growing ones.

Tumors of the glioma group which were found to contain cysts were spongioblastoma multiforme, ependymoma, polar spongioblastoma, oligodendroglioma, astrocytoma and gangliocytoma. Cysts also were encountered, associated with hemangio-endotheliomas and rarely with meningiomas.

A less important group of cysts encountered among elderly patients are those associated with arteriosclerosis. They are liquefied infarcts in which absorption of the debris has been completed, and which contain clear fluid. Blood pigment is often found in the walls of these cavities.

Lesions such as subdural hematoma, calcified cysts and echinococcus cysts may have demonstrable characteristics which immediately lead to a diagnosis. However, following exposure and aspiration of a subcortical cerebral cyst it is extremely difficult to identify its origin and pathologic changes. Realizing these difficulties, we are analyzing some of the more prevalent of these cerebral cysts in an effort to emphasize the outstanding characteristics.

The first case presented illustrates a congenital cyst which is an exaggeration of the condition of porencephaly or developmental absence of a portion of the cerebral hemisphere. This case has been described in detail elsewhere; however, since it is a good, even if extreme, example of this type of lesion, a brief summary is given.

REPORT OF CASES

CASE 1.—*Porencephaly.* A girl, aged 7 months, was brought to the Mayo Clinic because of progressive enlargement of the head. The child seemed normal for the first week after birth, and then began to have generalized convulsions. Because the head had increased in size and the convulsions were increasing in severity, the right lateral ventricle was aspirated through the anterior fontanel. The procedure relieved the convulsions, and it was repeated at intervals. However, the head gradually increased in size so that at the time of examination in the clinic it measured about 50 cm. in circumference, and the fontanels and sutures were open. The right side of the cranium was larger than the left. The results of neurologic examination were negative; the child moved all four extremities with equal strength, and the reflexes were slightly hyperactive. Dye was injected into the right lateral ventricle and was recovered by means of posterior cistern puncture. A ventriculogram revealed what appeared to be a markedly distended right lateral ventricle and a smaller left lateral ventricle.

When the dura was opened, clear fluid was aspirated, and with the aid of a lighted retractor, it was seen that the entire right hemisphere was absent, and only the basal ganglions were present. The falx cerebri, sella turcica and tentorium were visible, and we could see into the left lateral ventricle through the intraventricular foramina, which were very large. The choroid plexuses of the right and left lateral ventricles were removed.

Possibly this case should be in the porencephalic group of congenital cysts, which may simulate neoplasms or hydrocephalus. It is conceivable that a simple cyst could be present within the brain, caused either by inflammation or by a congenital anomaly. The classification of simple cysts would seem satisfactory

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for those having smooth walls, and clear fluid, and apparently being neither neoplastic nor congenital.

CASE 2.—*Simple cyst.* A man, aged 37, came to the clinic complaining of convulsions and failing vision of one year's duration. Four years before, when at work, he had suddenly lost consciousness, which lasted for twelve hours. Three months later, he had another seizure, and similar but shorter attacks occurred as frequently as four or five times a day. He occasionally fell, but recovered immediately and complained of slight transitory confusion, during which he suffered from propulsion or retropulsion. At the time of his first attack, he noticed that he could not see objects on the right side. There were never any headaches or vomiting, but there was a marked change in personality; this led to the loss of his position and friends, and he had little interest in his surroundings.

General physical examination and laboratory studies gave negative results. Roentgenograms of the head revealed increased intracranial pressure. Amaurosis of the right eye was complete, and vision in the left eye was diminished. The left field of vision showed marked concentric contraction, with an enlarged blind spot and no color vision. The pupils were slightly irregular; the left was larger than the right. There were bilateral secondary optic atrophy and residual edema of

Fig. 1 (case 4).—Lateral view of a calcified cyst in the left frontal lobe.

the disks, 1 diopter in the right eye, and 2 diopters in the left. Neurologic examination revealed an increase of the Achilles reflex on the right, and a reduction on the left. A ventriculogram localized the lesion in the right frontal lobe.

At operation, a subcortical cyst was found when the midfrontal convolution was incised. The cyst measured 10 cm. in diameter and contained 240 cc. of clear fluid. The walls were smooth and fibrous, and neither gross nor microscopic evidence of tumor could be found. The cyst was connected with the anterior horn of the right lateral ventricle to secure permanent drainage.

The patient recovered uneventfully. His mentality was greatly improved. No change could be discovered in the right eye, but there was marked improvement of vision in the left. Two years after operation, he could read fine print with correction, and improvement in his general condition had been progressive. He had returned to work and was supporting his family.

This simple cyst became sufficiently large to create slowly progressive increased intracranial pressure. The papilledema and optic atrophy, as well as the roentgenologic evidence of increased pressure, suggested a long course. The satisfactory response to operation with ultimate recovery indicated that little of the surrounding cerebral tissue had been destroyed.

In the third case the cyst was believed to be of traumatic origin, and yet this could not be determined prior to operation, because neoplasms may have a similar history of trauma.

CASE 3.—*Traumatic cyst.* A boy, aged 10 years, was brought to the clinic because of convulsions. Three years before, he had been thrown from a merry-go-round, striking the left side of his face and head; this had not been associated with loss of consciousness or ill effects. A year later he had a syncopal attack which was followed by a sensation of numbness of the right thumb, associated with temporary contractions of the hand and arm. Four weeks later, he had a grand mal seizure, which was followed at irregular intervals, from a few hours to several months, by jacksonian convulsions, which began in the right hand and sometimes involved the leg but were not associated with loss of consciousness. Occasionally, the right side of the face was involved. For six months prior to his examination at the clinic, administration of phenobarbital had diminished the number and intensity of his convulsive seizures.

General and neurologic examinations, including laboratory tests, and ophthalmologic examination gave negative results. A diagnosis was made of a lesion of the brain involving the left motor area.

At operation, a cyst measuring 6 cm. in diameter was found in the middle and inferior frontal convolutions on the left side. It was subcortical, and the vessels which are normally on the cortex were in the exposed wall of the cyst. Three of these vessels were ligated, the roof of the cyst was incised, and the contents, consisting of clear fluid, were aspirated. The lining was white and fibrous, and there was no mural tumor.

The postoperative condition of the patient was satisfactory, and he has remained normal for four years.

Although the operative findings in this case were similar to those in case 2, the history of trauma leads us to assume that the cystic mass was possibly the result of injury. History of trauma is common in cases in which tumor of the brain is suspected, although Parker and Kernohan reported that in only 4.2 per cent of a series of 431 gliomas of the brain was there previous history of injury which might have been an exciting factor.

In another case in which trauma evidently played an important part, the cyst was diagnosed and localized by means of roentgenologic examination.

CASE 4.—*Traumatic cyst.* A boy, aged 13 years, was brought to the clinic because of generalized convulsions. At the age of 3 years, he had fallen downstairs, and one month later, ter a mild convulsive seizure, he was unable to talk for six hours. A generalized convulsion, lasting half a minute and followed by weakness of the right arm, occurred shortly afterward. At the age of 4 years, a severe convulsion was followed by hemiplegia, aphasia and incontinence. He had no further attacks until he was 12 years old, when they recurred at weekly intervals for eight months. He was free from attacks until three months before examination, when the seizures recurred frequently, as many as seven in one day. Preceding each seizure, the right leg went to sleep; this sensation progressed up the right thigh and jumped to the right hand, and while ascending the right arm, the generalized convulsion occurred.

Roentgenograms of the head revealed a large calcified tumor in the left frontal lobe, extending 2.5 cm. beyond the median line (fig. 1). Neurologic examination revealed vertical nystagmus, moderate weakness of the lower three fourths of the right side of the face, moderate weakness of the right upper extremity and slight weakness of the distal portion of the right lower extremity. Because the margin of the tumor was more dense than the center, a diagnosis of calcified cyst in the left frontal area was made.

At operation the calcified mass was found 2 mm. below the surface of the cortex of the left frontal lobe and removed. It was 7.5 by 8 cm. in diameter, weighed 254 Gm. and was found to be a mass of cholesterol crystals surrounded by a

calcareous capsule 2 mm. thick. The cyst was considered to be the result of an old hemorrhage. There were no epithelial cells or living tissue in the capsule or in the contents of the cyst.

After returning home, the patient continued his school work and graduated from high school; he is quite well at present.

The condition in this case differs from that in case 3, in that it was evidently primarily hemorrhagic, with secondary calcification of the capsule.

Parasitic cysts of the brain are rare in this country, in spite of the freedom with which communication and intermingling of races take place. However, case 5 is an interesting example of echinococcal infestation:

CASE 5.—*Parasitic cyst.* An Italian laborer, aged 47, who came to this country at an early age and lived in the middle west, was brought to the clinic for examination. He had been well until two and a half years previously, when he suddenly lost consciousness. A convulsion had not occurred; he was unconscious for from five to ten minutes, and this was followed by weakness of the left side of the body. Fourteen similar attacks occurred in twenty-four hours. During the ensuing year and a half, he was able to work and felt well, except for slight weakness of the left arm and leg, when he began to complain of right-sided headaches in the morning and projectile vomiting, of attacks of petit mal with tremor of the left arm and leg, followed occasionally by slight, temporary weakness, of tinnitus, and of hallucinations of smell. He was unable to dress himself and frequently was incontinent.

A serologic test for syphilis and other laboratory tests gave negative results. Roentgenograms of the head gave negative results, as did examination of the eyes. Neurologic examination was essentially negative except for diminution of the acuity of smell on the right side, and weakness of the entire left side. The pressure of the cerebrospinal fluid was greatly increased. Each cubic millimeter of the fluid contained 128 small lymphocytes, 43 large lymphocytes and 75 polymorphonuclear leukocytes; otherwise, examination of the fluid gave negative results. On account of the apparent change of personality and left-sided weakness, a diagnosis was made of a lesion in the right frontal lobe.

At operation the dura was extremely vascular, and when incised, the convolutions were flattened, broadened and pale yellowish white. An opaque exudate surrounded the vessels of the cortex. In the superior temporal convolution there was a bluish cystic area 3 cm. in diameter; when this was opened, clear fluid under pressure was found. Several hydatid cysts, from 3 mm. to 1 cm. in diameter, were found floating free in the fluid of the cavity (fig. 2). These had opaque walls, and some seemed to have been torn loose from a stalk. The cavity was explored. It extended into the parietal lobe, and was about 8 cm. in diameter; at its base there was a stalk which was ligated and resected. Histologic examination of the fluid, the stalk and daughter cysts revealed the characteristic hooklets of Taenia echinococcus.

The patient recovered sufficiently to return home, but improved very little clinically, although he was still living when last heard from.

Neoplastic cysts vary from the most malignant spongioblastoma multiforme to the least malignant astrocytoma or oligodendroglioma. They may be completely surrounded by tumor tissue, or the walls may be smooth and glistening and contain only one small nodule of neoplastic tissue. The surgical procedure depends on the situation and extension of the cyst, as well as on the degree of malignancy and the size of the associated neoplasm. Some of the more common forms of neoplastic cysts are presented in order to show that differential diagnosis between these and a neoplasm is impossible, except at operation, and that any cyst encountered at operation may be neoplastic.

CASE 6.—*Spongioblastoma multiforme.* A man, aged 54, came to the clinic complaining of frontal headaches and convulsions. He had been in excellent health until six months previously, when suddenly a generalized convulsion with loss of consciousness developed. A week later, he complained of severe headaches in the morning over the left frontal region. These headaches increased in severity until they were brought on by change of position. Following his first convulsion he had attacks each month, with slight residual weakness of the right upper extremity. A slight change of personality also developed.

General and ophthalmologic examinations gave essentially negative results. Neurologic examination revealed slight weakness of the right upper extremity. The clinical history and course of the disease suggested a progressive lesion of the frontal lobe. This was confirmed by a ventriculogram which gave evidence of obliteration of the anterior horn of the left lateral ventricle, with displacement to the right.

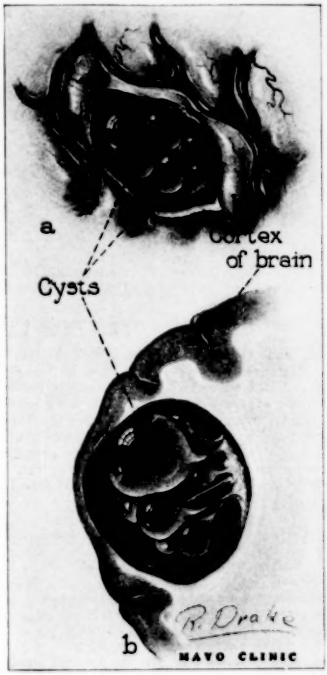

Fig. 2 (case 5).—Echinococcus cyst in the right lobe of the brain. *a* indicates the appearance at operation; *b*, cross-section of the cyst.

At operation the left frontal convolutions were flattened and broadened. From a cystic tumor 1 cm. below the cortex, 30 cc. of yellow fluid was aspirated. The inferior frontal convolution was incised, and neoplasmic tissue lined the wall of the cyst. Tissue removed showed it to be a spongioblastoma multiforme, and because of its situation, type and extent, further operation was not attempted. Temporary improvement followed for a period of six months, when the patient died suddenly.

The less malignant type of gliomatous cysts should be resected if possible, yet the following case demonstrates that the condition of the patient should influence the extent of the operation.

CASE 7.—*Astrocytoma.* A man, aged 52, came to the clinic stating that he had been well until four and a half years

before, when a generalized convulsion occurred which had been preceded by twitching of the fingers of the right hand and muscular contraction of the right side of the body. Similar attacks occurred three times a day for three days, but were controlled by the use of phenobarbital until four months prior to admission, when they recurred every hour. During the last attacks consciousness was not lost, but transient aphasia was present. During the month prior to registration, the right hand

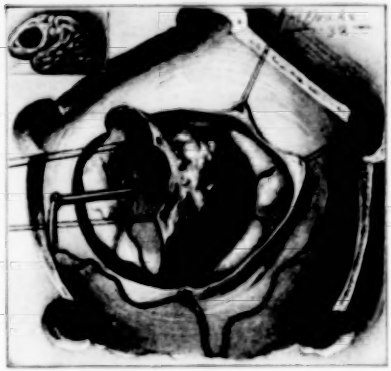

Fig. 3 (case 7).—Cystic astrocytoma of the left frontal lobe.

and leg became weak; this progressed to paralysis within two weeks.

General and ophthalmologic examinations gave negative results. A moderate degree of aphasia and definite weakness of the muscles of the right side of the mouth and tongue, as well as those of the right arm and leg, were present. The tendon reflexes were reduced in the right upper extremity; the patellar and hamstring reflexes were increased, and both Achilles reflexes were decreased. The sensory examination was unsatisfactory because of the aphasia. A diagnosis of tumor of the brain involving the left temporoparietal area was made.

At operation the dura was tense, and when it was incised, a large, infiltrating, vascular, cystic tumor involving the frontal and parietal convolutions was seen. The dura mater was adherent to, and was very vascular over, the tumor. Thick yellowish fluid escaped from the cystic portion of the tumor when aspirated (fig. 3). There appeared to be a line of demarcation separating the tumor from the surrounding brain, and complete removal was effected by dissection along this line. Histologic study showed the lesion to be a fibrous astrocytoma.

The patient's condition seemed satisfactory, but one hour after the completion of the operation he died suddenly. At necropsy the tumor was found to have been completely removed.

Gliomatous cysts which respond most satisfactorily to surgical treatment are either those which have completely liquefied, or those which contain only a mural nodule of tumor tissue. The complete removal of the nodule prevents refilling and recurrence. Case 8 is a good example of relief following operation, lasting for five years without symptoms of recurrence.

Case 8.—*Oligodendroglioma.* A girl, aged 5 years, was brought to the clinic with the history of being well until six weeks before admission, when she stumbled and fell while going downstairs. There was no evidence of injury, but following this accident she limped with the left leg. Three weeks later, she complained of right temporal headaches in the morning, which lasted only a short time and were not accompanied by vomiting.

General examination was essentially negative, except that the vision of the left eye was 6/6, and that of the right eye, 6/30; the pupils, field and optic reflexes were normal. There was a bilateral choked disk, measuring from 2 to 3 diopters. Neurologic examination revealed weakness of the left side of the face and body, and a positive Babinski sign was also present on the left. A diagnosis was made of a lesion involving the right motor areas.

At operation the dura mater was tense. A cyst containing about 120 cc. of yellow fluid was encountered near the posterior horn of the right lateral ventricle. When the cyst was opened with the electrosurgical unit, a nodular tumor was found on the mesial wall (fig. 4). This was removed completely, so far as could be determined grossly. A small strip of dura was inserted into the cyst for the purpose of drainage. On microscopic examination, the neoplastic tissue proved to be an oligodendroglioma.

The patient's recovery was uneventful. Only slight weakness of the left side remained. Examination twenty months later revealed that the child was normal and had been attending school regularly. She has continued in excellent health for five years and two months.

Often a gliomatous cyst embedded in a tumor is encountered, and the situation and extent of the tumor, as well as the condition of the patient, prohibit extensive resection. The cyst may be drained with subsidence of symptoms, and a later operation may be carried out for more complete removal of the tumor. Sometimes the size of the tumor prevents more than a palliative operation as a second stage.

Case 9.—*Astroblastoma.* A man, aged 33, registered at the clinic and gave a history of having been in good health until eight months previously, when he noticed that his right hand was weak and that his speech was slower than normal. Two weeks later he suddenly felt his lower jaw tremble, and he became unconscious; these attacks recurred at monthly intervals.

Examination revealed right hemiparesis with increased reflexes, a positive Hoffmann and Babinski sign, a spastic gait and slight aphasia, without evidence of increased intracranial pressure. A diagnosis of tumor of the brain involving the left frontomotor region was made.

Operation was postponed for three months at the patient's insistence, at which time it was found that the weakness of the right side had progressed. He also complained of recurring attacks of jacksonian type, involving the jaw and right side of the thorax, followed by numbness of the right hand

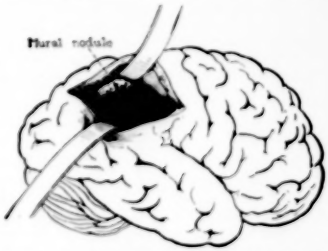

Fig. 4 (case 8).—Cystic oligodendroglioma with a mural nodule.

for one hour. A trocar inserted through the superior temporal convolution encountered a cyst containing 60 cc. of yellow fluid, which clotted on standing. Following removal of the fluid, the cavity was opened, and the walls were found to be lined with tumor tissue, which was so extensive that further surgical procedure was not attempted other than applying Zenker's fluid to the walls. After an uneventful recovery the patient returned home; he was able to work for about seven months, when the cyst filled. Aspiration carried out at his home was followed by complete relief, but because this was

only temporary he returned for a second operation. The cystic cavity was explored again, and was found to be filled with a degenerating fungus-like mass, the greater part of which was removed.

The patient's convalescence was uneventful, and at dismissal motor power in his right upper arm had increased. He continued to improve for three months, when sudden paresis of the entire right side developed, associated with convulsions. He became gradually weaker and died seven months after the last operation.

The tissue removed at operation and at necropsy proved to be astroblastoma. The tumor was very large, and had completely surrounded the cyst.

The malignant nature of the tumor responsible for the cyst is largely responsible for the tendency to recurrence. The benign nature of oligogliomas is well known, and the excellent result in the following case is probably caused by the fact that the tumor belonged to this group.

CASE 10.—*Oligodendroblastoma.* A man, aged 43, came to the clinic complaining of headaches and drowsiness. Ten months prior to examination, he began to have headaches in the morning and evening, usually frontal, but occasionally occipital; these had become progressively worse. In the six weeks preceding admission, drowsiness had slowly increased. Spasmodic contractions of the left arm lasting from three to five minutes occurred without loss of consciousness.

Examination gave negative results. The cerebrospinal fluid was xanthochromic and had a positive Nonne reaction. It contained 99 small lymphocytes, 261 large lymphocytes and 51 polymorphonuclear leukocytes in each cubic millimeter. A diagnosis of a lesion of the right frontal lobe was made.

A cyst containing 30 cc. of yellow fluid was found to be enclosed by a large infiltrating tumor, and because of the condition of the patient and the size of the tumor, removal was not attempted. The cavity was swabbed with Zenker's solution, and a strip of dura was turned into the cyst for permanent drainage. Histologic examination of the tissue removed showed it to be an oligodendroblastoma.

The patient's convalescence was stormy, but he improved following repeated spinal punctures. After receiving two courses of roentgen treatment he went home and has continued working for twenty-three months without any recurrence of symptoms.

The compilation of numerous histories of intracranial lesions demonstrates the futility of making a pathologic diagnosis of the lesion from the duration of the illness. The brain becomes accustomed to slowly progressing compression, and a lesion which has been present and enlarging for a long time may produce a short clinical history of symptoms. For that reason exploration is essential in the majority of cases in which the history and examination indicate increased intracranial pressure.

In the presence of the more benign types of tumor a second operation may be required much later than in the more malignant types. In the following case the patient was completely relieved for six years, and this is a common occurrence in the slower growing types of tumors.

CASE 11.—*Gangliocytoma.* A girl, aged 16 years, was brought to the clinic because of frontal headaches, vomiting and difficulty with vision. She had been perfectly well until five months previous to examination. She had a generalized convulsion three days before examination.

Examination of the eyes revealed bilateral acute choked disks of 6 diopters, with right homonymous hemianopia. At operation a large cystic glioma was found in the left temporal lobe. This contained about 90 cc. of yellow gelatinous fluid, which clotted on standing. The major portion of the tumor was removed, with some of the surrounding tissue. On histologic examination, the tumor proved to be a gangliocytoma with many neuroblasts and some mitotic figures. Following operation, convalescence was satisfactory; the choked disks receded, but the vision did not entirely return to normal, on account of the presence of secondary optic atrophy.

The patient remained well for six years, when she returned to the clinic complaining of vague generalized pains in the joints and headache, which had been present for four weeks, associated with vomiting. Examination revealed that the former decompression wound was bulging, and signs of increased intracranial pressure were present. A second operation was done, and the left temporal lobe was found to be filled with a granular red tumor which was partially removed. Histologic examination proved this to be well differentiated gangliocytoma. The patient was relieved of all symptoms. A course of roentgen treatment was given. She returned home, and after a period of five months, died suddenly.

Evacuation of the contents of a gliomatous cyst is followed by transient relief of symptoms in the majority of cases. This palliative procedure is frequently important in order to prepare the patient for a more extensive operation. Case 12 illustrates the importance of palliative measures when a lesion of the brain complicated pregnancy. The patient was relieved of intracranial symptoms until the completion of gestation and a cesarean delivery. The tumor was then removed.

CASE 12.—*Protoplasmic astrocytoma.* A woman, aged 28, came to the clinic complaining of headache and visual disturbance. She had been in excellent health until four years before examination, when she began to suffer from severe attacks of headache and blurring of vision. These attacks came on at intervals of one year for three years, and lasted from three to four weeks. She became pregnant two months before examination, since which time she had had six or seven attacks of numbness involving the entire body, associated with severe headaches. Following the last attack, she became comatose for one hour.

General and neurologic examinations were essentially negative, except for the condition of pregnancy. Roentgenograms gave evidence of increased intracranial pressure. A bilateral acute choked disk of 3 diopters was found in each eye, with a right homonymous hemianopia. A diagnosis of tumor of the left temporoparietal region was made.

At operation a large cystic glioma was found involving the left temporoparietal region, from which 50 cc. of thin yellow fluid was aspirated. Because of the pregnancy, it was decided to postpone a more radical operation until later.

Following operation, the patient's condition improved, she was relieved of her headaches, and she was given three courses of high voltage roentgen therapy. The choked disks receded, and the visual fields improved. She was observed during the period of pregnancy, and when she came to term, a cesarean section was done, following which the patient and infant were in excellent condition.

One month after the cesarean section, the bone flap was elevated again, and the cyst explored. On the posterolateral wall of the cyst, a nodule of tumor was found and completely removed. This was found to be protoplasmic astrocytoma. Following an uneventful convalescence, the patient returned home, and has been in excellent health for three years.

The following case illustrates similarly the relief which often follows partial removal of a neoplasm of low degree of malignancy. It is sometimes impossible completely to remove a cystic tumor, and when dealing with the less malignant types of neoplasm, it is advisable at times to remove as much tissue as is commensurate with the safety of the patient, and palliative relief lasting for years may ensue.

CASE 13.—*Ependymoma.* A woman, aged 43, came to the clinic complaining of headaches which began six years previously. Jacksonian attacks followed by paresis of the right side, with transient hemianopia, had occurred frequently during the previous six months.

General and ophthalmologic examinations gave negative results, but neurologic examination revealed marked weakness

of the entire right side of the body, with increased reflexes. A diagnosis of tumor involving the left motor cortex of the brain was made.

At operation, the left precentral convolution was found to be broadened and flattened. It fluctuated on palpation, and 15 cc. of yellow gelatinous fluid was aspirated. The cortex was incised, and a dark purplish-red, mucoid, granular tumor was found, which was almost completely removed. After an uneventful convalescence, the patient was dismissed with a slight residual right hemiplegia. This gradually decreased, and she has been able to do her own housework and take part in the activities of the community for the last three years.

It is unusual to encounter a cystic condition with meningiomas, and because of its rarity the following case is presented.

CASE 14.—*Endothelioma.* A laborer, aged 55, registered at the clinic stating that he had been perfectly well until six months previously, when the day following a minor injury to the back of his head and neck he suffered from a generalized convulsion which recurred from every two to four weeks.

Examinations gave essentially negative results, and the patient was advised to take phenobarbital and to return later for another examination. Three months later he returned, and stated that he had had a generalized convulsion with a residual weakness of the left side. Another attack had been preceded by twitching and spasm of the left hand, followed by transient left homonymous hemianopia. Also, he had frequently noticed muscular twitching in the left forearm when

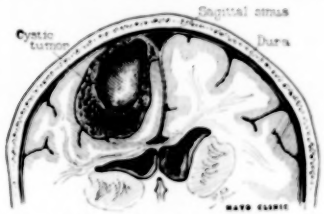

Fig. 5 (case 14).—Cystic parasagittal meningioma.

sitting quietly. At this time, neurologic examination revealed definite, although slight, left hemiparesis, with increased tendon reflexes and tremor of the left hand. A diagnosis was made of tumor of the brain involving the right frontomotor area.

When the dura was opened, a large, reddish, soft tumor was found on the surface anterior to the rolandic area; it extended to the median line and was attached to the longitudinal sinus (fig. 5). The tumor was cystic, and it collapsed following aspiration. The cystic fluid was yellow but did not clot. The tumor was completely removed, with a portion of the longitudinal sinus. Grossly, it had the appearance of a hemangio-endothelioma, but the microscopic examination showed it to be a meningioma.

Compilation of the characteristics of cerebral cysts encountered at the operating table reveals similarities

TABLE 1.—*Cerebral Cysts*

Type of Cyst	Color of Fluid
Congenital	Clear
Traumatic	Clear; cholesterol
Parasitic	Clear
Inflammatory	Clear
Gliomatous	Yellow

which may be confusing in arriving at a definite diagnosis. A comparison of the cystic fluids revealed that in general the congenital, traumatic, parasitic and inflammatory fluids were clear except from the recent and calcified traumatic lesions. Yellow was the characteristic color for the neoplastic cysts (table 1).

The chemical analysis of these fluids did not reveal any outstanding change from cerebrospinal fluid except a tendency to contain an increase of the total proteins.

TABLE 2.—*Gliomatous Cysts*

Type of Tumor	Amount of Fluid, Cc.	Color	Percentage of Cysts
Astrocytoma	30-150	Yellow	15
Oligodendroglioma	10-120	Yellow	34
Polar spongioblastoma	40-90	Yellow	33
Ependymoma	15-70	Yellow	75
Spongioblastoma multiforme	15-30	Yellow	45
Gangliocytoma	10-15	Yellow	9
Hemangio-endothelioma	10-16	.....	41
Meningioma	30	.....	1.5

For the purpose of comparison the neoplastic cysts were examined to determine the amount of fluid which was present and the tendency to form cysts (table 2).

SUMMARY

Cerebral cysts encountered at operation may be congenital, inflammatory, traumatic, parasitic or neoplastic. To the neurosurgeon, the most important and common group encountered is that which occurs with neoplasms; these were found to be associated with practically all types of primary tumors of the brain above the tentorium. A much rarer type of tumor in this situation, containing cysts, is the meningioma, of which only two were encountered.

It was found that only the neoplastic cysts consistently contained xanthochromic fluid, whereas all the other cysts contained clear fluid. It was noted further that in general the more benign the glioma, the more prone it was to undergo cystic degeneration.

Decompression and simple drainage was often followed by a long period of palliative relief, thus allowing the more radical procedures, such as partial or complete removal of the tumor when the patient's condition warranted. Following initial drainage, subsequent aspirations were sometimes necessary to prolong the palliation. Several operative procedures were sometimes necessary for the more benign tumors in order to remove them completely.

ABSTRACT OF DISCUSSION

DR. JAMES W. KERNOHAN, Rochester, Minn.: For several years I have had the idea that there were limited types of tumors in which cysts could be found, and consequently I was very much interested in this study, in which Dr. Craig found that practically every type of glioma underwent cystic degeneration. Occasionally we found the tissue of the tumor completely surrounding the cyst and, on the other hand, we often found the so-called mural nodule that was mentioned. Theoretically it seems possible for a tumor to disappear completely and to leave only a cyst, which would be almost impossible to distinguish at operation or histologically from the so-called simple or traumatic cyst. It is impossible to make a differential diagnosis of a simple cyst, traumatic cyst or inflammatory cyst by microscopic examination alone. Such diagnosis must be made in conjunction with the history the patient gives of the antecedent of the cyst. There are at least two hypotheses that may be thought of in connection with the possible cause of cyst formation which occurs along with tumors. One is that there is a transudate from the wall of the tumor, such as is supposed to occur in Lindau's disease. The other possibility is that in tumors the blood supply does not progress as rapidly as the growth of the neoplasm. The blood supply in the center is insufficient, and degeneration occurs or the more slowly growing and denser tumors have an insufficient blood supply and degeneration occurs in the center.

DR. HANS H. REESE, Madison, Wis.: The presentation of Drs. Craig and Kernohan is the first comprehensive clinico-surgical study on cerebral cyst. The authors demonstrate that the most careful clinical investigation of all etiologic factors too often fails in the differentiation of intracranial lesions. The diagnosis of cerebral cysts is a difficult one because no objective signs or clinical symptoms permit the differentiation of a cyst from a tumor, at times from encephalomalacia or liquefied infarcts. It is true that the history or the variation of headaches on straining, coughing and sneezing suggests a cyst, or that encephalographic studies demonstrate a communicating porencephalitic cyst with the ventricular system, or with the pia-arachnoid spaces. Commonly, cases of serous meningitis or of circumscribed cystic meningitis are caused by trauma or infection. They are not cysts, properly, but they have been described under the misnomer pseudotumors. I agree that the most common form of cerebral cyst is the neoplastic. If one encounters a simple cyst, a careful microscopic examination of the cyst wall should be performed for hemangioma, to rule out the classification of such a cyst as belongs to Lindau's syndrome. Although it is extremely rare to find this kind of cyst in the cerebrum, one has to keep the possibility in mind. The parasitic cysts have been seen more often in Europe, especially since 1914. Sato reported 128 cases of infestation with Cysticercus cellulosae, with forty-eight positive manifestations in the fourth ventricle, and Sprotte reported eighty cases in the literature with such abnormalities in the fourth ventricle. Naturally, in these cases of parasitic cysts the blood eosinophilia necessitates a search of the spinal fluid, not only for eosinophil cells but also for cysticercus membranes or hooklets of the echinococcus. Analysis of the clinical data available on cerebral cysts did not reveal any complaints or clinical signs that would permit of differentiation of a cyst from a tumor. I have the feeling that cysts are more stationary, with more extreme fluctuation in the subjective complaints. I agree with the authors that only early exploration and aspiration will clear the situation. The approach and treatment have been so well covered in this paper that it is not necessary to make any comment.

DR. J. RUDOLPH JAEGER, Denver: The tumors that are associated with cysts are usually the ones most amenable to surgery; for example, the pachymeningitis cyst or the gliomatous cyst with a small intramural tumor. The possibility of a cyst being present in an extremely ill patient showing signs of intracranial pressure must be constantly kept in mind. By ventricular estimation combined with a careful neurologic examination, the tumor mass in many instances may be sufficiently localized, so that through a trephine opening the cyst can be evacuated and the patient's condition improved to a point at which an extensive craniotomy may be performed. It must be realized that a great percentage of brain tumors, above the tentorium as well as below it, by pressing on the third ventricle or aqueduct of Sylvius, produce a cystic collection of cerebrospinal fluid in the lateral ventricles or in the ventricle on the side opposite the tumor. One puncture of the cystic ventricle will frequently save the life of the patient for further surgery, or, as I have been doing recently, by the insertion of a small ureteral catheter into the ventricle through a ventricular needle, thereby gradually decompressing the ventricle over a period of several days. A large percentage of patients with tumor come to the neurosurgeon in an extremely critical condition. Many even in such a state can be saved if a cyst can be evacuated or a cystic ventricle can be decompressed. The young woman mentioned by the authors came under my care when I first began to do neurosurgery. Dr. Learmonth, doing an exploratory operation, found a cyst in the temporal lobe and had put the bone flap back in place because of some operative difficulties. He sent her home to improve for a craniotomy later. I received a call, when I was 200 miles up in the mountains on a vacation, to hurry back to Denver. At that time the woman was in stupor and almost in coma. I found her in a critical condition from pressure. By perforating through a trephine opening that had been left by Dr. Learmonth and by evacuating the cyst of about 2 ounces of fluid, I was able to improve her condition. She returned later to Dr. Learmonth for removal of a mural tumor, and she is well today, three years later.

RECENT IMMUNOLOGIC STUDIES IN HYPERSENSITIVITY TO TOBACCO

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The studies which form the actual experimental basis of this report were carried out, principally, on patients with typical thrombo-angiitis obliterans and on a control group of smokers and nonsmokers without this disease.

Before entering into the discussion of my experimental results, I should like to mention certain fundamental immunologic concepts which led to the theory that thrombo-angiitis obliterans, a disease in which the rôle of tobacco has frequently been mentioned and acknowledged by most observers, might be a localized hypersensitivity of certain groups of blood vessels to circulating allergens derived from or contained in tobacco.

The first of these concepts is that of localized and circumscribed fixed specific hypersensitivity. Although examples of this may be found in every form of hypersensitivity and in every organ, they are best known, as is only natural, in the skin, and are most clearly evident to the immunologically minded dermatologist.

Perhaps the most frequently encountered example of localized and fixed specific altered reactivity is the mycotic eruption known as dermatophytid of the hands. In this condition, as is now well known, fungi, often originating from foci on the feet, although entering the blood stream and thus presumably coming in contact with all the tissues of the body, often cause manifest lesions only in the areas of fixed localized altered reactivity on the hands.[1]

Another, perhaps even more striking, example is to be found in the so-called fixed drug eruptions. Here the drug—phenolphthalein, for example—taken by mouth enters the blood stream and must be distributed in approximately equal quantities throughout all the organs of the body and all parts of the skin. And yet, in certain hypersensitive persons, it is of frequent occurrence that only a round or oval, sharply circumscribed area of the skin reacts to the circulating drug. It is known that hypersensitivity to phenolphthalein often becomes manifest in a circumscribed area on the glans penis and, sometimes, at this site alone. On the other hand, there are drugs—the arsphenamines, bromides and iodides—which have a predilection for other sites. Just as these circulating drugs selectively sensitize and attack certain parts of the skin—the follicles and cutaneous and subcutaneous vessels—so other drugs and circulating substances may be able selectively to sensitize and to attack other organs or parts of organs. I believe that such examples may be found in the cases of acute yellow atrophy of the liver sometimes caused by incredibly small doses of cinchophen derivatives and in the cases not infrequently caused by arsphenamine, in the cases of purpura cerebri (encephalitis haemorrhagica) caused by arsphenamine, or in the cases of asthmatic attacks following the ingestion or injection of quinine.

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From the Dermatological Service of Montefiore Hospital and the Department of Dermatology of the New York Post-Graduate School of Columbia University.

1. Jadassohn, Werner, and Peck, S. M., cited by Sulzberger, Marion B., and Lewis, G. M.: Trichophytin Hypersensitiveness Demonstrated by Contact Tests, Arch. Dermat. & Syph. **22**: 410 (Sept.) 1930.

Embodied in this concept there is, to a certain degree, merely a modern paraphrasing of the old statement that certain persons possess an area or areas which are more susceptible to attack—loci minoris resistentiae. But the newness of the concept lies in attributing some of these pathologic reactions to a fixed and specific immunologic process, and this opens new ways for study and experimentation.

The consideration of certain fixed areas of lowered resistance as sensitization phenomena brings in its train other immunologic concepts. The next to be mentioned is that of the predilection of certain allergens to sensitize and elicit reactions in certain tissues, often to the exclusion of all other tissues. One might even say that each allergen has its favorite point of attack. Most of the aforementioned examples illustrate this point. There are many other dermatologic conditions which show this sharply focused selectivity. For instance, certain circulating allergens, such as quinine and formaldehyde, frequently attack the epidermis alone, while others—for example, shellfish, strawberries and the iodides—often confine their deleterious effects to the vascular layers of the upper cutis. We thus distinguish between eczematogenous and urticariagenic noxae.

The third immunologic concept is that not only sudden and evanescent reactions are caused when the excitant meets the specifically sensitized shock tissue, but also chronic reactions and permanent organic damage are often caused by one or successive shocks resulting from such encounters. This concept is one which has not, in my opinion, received the recognition it deserves. It has been my experience, in discussing the theme of the present paper with immunologists and physicians, that the majority are disinclined to accept permanent damage as characteristic of certain forms of hypersensitivity, and consider this concept to be unorthodox or new. And yet, there are innumerable classic examples of allergic reactions resulting in permanent damage.

The oldest and perhaps the best known example is that of the Arthus phenomenon in horse serum sensitization. Here vascular thrombosis and obliteration lead to necrosis and slough.

Classic dermatologic examples of such destructive and nonephemeral reactions are to be found in the vegetating and ulcerating iododermas and bromodermas, in which the active processes are often of astonishingly long duration; the destruction thus brought about leads to scarring. There are even cases on record in which iododermas and bromodermas have proliferated in a manner similar to that of malignant tumors (sarcomas, or the almost neoplastic tumors of lymphogranulomatosis and mycosis fungoides); in spite of absolute elimination of contact with the eliciting drug, these conditions have eventually brought about the patient's death (Eller and Rein and Bloch and Tenchio[2]).

Common examples of destructive lesions originating in the vascular apparatus of the skin resulting from sensitization to and contact with micro-organisms or their products are: tertiary syphiloderms (hypersensitivity of the skin to luetin), erythema induratum Bazin (hypersensitivity of the skin to tuberculin) and papulonecrotic tuberculids.

The fourth immunologic concept includes the principles of idiosyncrasy and the harmless nature of allergens to the nonhypersensitive. My interpretation of idiosyncrasy, as applicable to most cases, is that it is a differentiation from the norm which lies in a quantitative abnormality rather than in a qualitative one. By this I mean that the idiosyncratic person becomes sensitized to concentrations and quantities of excitants that do not bring about sensitizations in normal persons. This quantitative hypothesis receives support from the observations that wherever excitants have been sufficiently concentrated in vitro or have been sufficiently diluted, the percentage of persons who could be sensitized has been in proportion to the degree of concentration. In other words, the greater the concentration of a given allergen, the larger is the number of persons who could be sensitized (Bloch, primrose; R. L. Mayer, paraphenylenediamine, and Doerr, horse serum in guinea-pigs). According to this hypothesis, if milk, eggs, wheat, pollens or any other common causes of sensitizations could be sufficiently concentrated, these concentrates should sensitize all persons exposed to their contact. However, this has not, as yet, been proved, and one must accept the fact that substances absolutely harmless and incapable of sensitizing normal persons in concentrations in which they are commonly encountered cause sensitizations and severe reactions in certain (idiosyncratic, atopic and allergic) persons. These idiosyncrasiogens, excitants and allergens are generally not poisons in the pharmacologic toxicologic sense, nor are they primary toxins of bacterial nature. They became harmful only after, and due to, sensitization (certain bacterial diseases are, in all probability, due to a similar process: in pathologic conditions due to the tubercle bacillus or to Spirochaeta pallida, which elaborate no known toxins, the sensitization and the immunologic phenomena are among the essential and causal factors).

The fifth immunologic concept is that in man the vascular system is one which seems to be peculiarly susceptible to sensitizations and is thus most frequently the seat of reactions. This concept may appear to be at variance with the older view concerning the seat of reaction in such a classic sensitization as human asthma. It has long been believed that in this condition the smooth muscles of the bronchioles comprised the shock tissue. But more recent studies make it seem possible or even probable that—even in asthma—the blood vessels in the lungs are the first areas to react, and that the damage to these vessels, their increased permeability, the extravasation of fluid and cells and the tissue edema play a large, if not a preponderant rôle in bringing about the shock syndrome.

I do not believe that any one can doubt that the blood vessels of the conjunctiva and of the nasal mucosa may well be the seats of reaction in hay fevers and vasomotor rhinitis (see the recent experiments of M. Walzer). In the skin, with the exception of the eczematous reactions which are confined to the epidermis, the blood vessels of the cutis and subcutis are almost always the shock organs. Examples proving this may be found in: erythema nodosum (due either to micro-organisms and their products, or to drugs, such as bromides, iodides and phenolphthalein), follicular trichophytids and tuberculids, livedo racemosa and, perhaps most common of all, petechiae, the purpuras, angioneurotic edemas, urticarias and disseminated neurodermites.

By means of the usual technic of testing the skin (the scratch or intradermal methods), the allergen is brought in contact with the superficial vessels of the cutis and the sensitive tissues. The reaction, either

2. Bloch, B., and Tenchio, F.: Zur Klinik und Pathogenese des Bromoderma vegetans, Arch. f. Dermat. u. Syph. **165**:93, 1932.

directly or indirectly, eventually damages the wall of the capillary and permits extravasation of fluid and certain blood cells. In my opinion, this reaction may certainly be regarded as another example of vascular hypersensitivity.

It appears to me to be a plausible hypothesis that the skin serves as a test tissue in so many different forms and so many differently localized internal hypersentitivities because, through tests on the skin, one brings to light a hypersensitivity of a certain part of the vascular system (i. e., the upper cutis or papillary capillaries) which may be associated with hypersensitivity of the same shock tissue elsewhere, i. e., with a hypersensitivity of the blood vessels in other and, perhaps, far distant organs.

This leads me to the sixth and last immunologic concept to be mentioned, namely, the usefulness of the skin as a test tissue in a great variety of hypersensitivities of internal organs. This utility has already been recognized and adequately employed in many diseases of hypersensitivity such as asthma, hay fever, migraine, tuberculosis and so forth. I believe that we are only beginning to realize the possibilities of this method. All diseases which have the characteristics of hypersensitivity and idiosyncrasy, even though the pathologic process is sharply localized in a certain organ or even part of an organ, should be studied as possible sensitizations and investigated by means of tests on the skin. The conditions which fall into this class are too numerous to mention, and I shall name only a few of those in which my experience has shown this to be a fruitful approach: appendicitis syndrome (proved by hypersensitivity to arsphenamine in one case), neuralgia (proved by hypersensitivity to tobacco in two cases), keratitis (proved by hypersensitivity to iodide in one case), and alcoholic psychosis (proved by hypersensitivity to rye whisky in one case).

Many other diseases must, of course, be studied in this manner, for instance, uveitis, retrobulbar neuritis, angina pectoris, coronary disease and gastric ulcer (Harkavy).

While these are all examples in which the fundamental immunologic concepts I have mentioned may be at play, my results in testing the skin of patients with thrombo-angiitis obliterans with tobacco bring to light more clearly the various principles I have mentioned.

TECHNIC

The method of testing the skin which my collaborators and I used in carrying out these studies is the classic one employed in hay fevers and asthmas. Approximately 0.01 cc. of the excitant is injected intradermally and the site observed for at least one-half hour to note the growth of the wheal and the development of the surrounding erythema.

We employed ten different extracts of tobacco, six of which were prepared by the usual methods of extraction (Coca) from standard brands of cigaret and pipe tobaccos, two from two different kinds of uncured tobacco leaf and two from mixtures of a great variety of tobaccos. These tobacco extracts were all denicotinized to such a high degree that large doses (1 cc.) were no longer fatal to mice. In addition to these denicotinized extracts, we employed a solution of 0.4 per cent nicotine sulphate which, when diluted two and one-half times further, and when injected subcutaneously in doses of 0.2 cc., killed mice within from two to five minutes.

RESULTS

As a first group, twenty-four patients with typical thrombo-angiitis obliterans were tested with the solutions mentioned in the manner described. Nineteen of these, or 78 + per cent, gave immediate positive wheal reactions [2a] to one or more of the tobacco extracts, the reactions ranging from + to + + + (+). These findings agree, in great measure, with those of Harkavy and his associates, who made similar investigations.[3]

As a second group, I tested ninety-five smokers in a hospital population which included many cases of a great number of different diseases which were not selected in any way except to exclude cases of thrombo-angiitis obliterans. I also tested fifty healthy adult smokers (physicians, nurses and hospital personnel). The percentage of positives in this group was 36 +. There were no differences in the percentages of positive reactions among the hospitalized patients and the healthy personnel. There were no differences in the percentage of positive reactions elicited in male and female subjects and no differences in the cutaneous reactions of Jews and non-Jews. Thus, in my second group—that of smokers—36 per cent of the persons tested reacted to tobacco. (For a more complete discussion of these findings see Sulzberger.[4])

A third group which was tested comprised fifty-eight nonsmokers. Only nine of these, or 16 per cent, had positive reactions of the skin to tobacco.

I believe it justifiable to conclude from these figures: (1) that a sensitization to tobacco exists; (2) that tobacco smoking brings about a sensitization of the superficial vascular layers of the cutis to tobacco extracts, and (3) that a markedly higher percentage of persons afflicted with thrombo-angiitis obliterans have a sensitized cutaneous vascular system than is to be found in other smokers.

I should like to discuss the experimental results at the conclusion of the report of each group of experiments. But, at this point, I must first say a word about tests of the skin in general. Elsewhere, in a discussion of the patch test, I have elaborated on the criteria in judging positive tests and evaluating their clinical significance.[5] What I have said concerning patch tests seems to me to apply to other types of tests of the skin and to the immediate wheal reaction which is here observed. A test must be considered positive only when: (1) it is not elicited by a so-called primary irritant, that is, not by a substance in a concentration which will cause reaction in all or in a large majority of skins; (2) the reaction is identical with or analogous to the condition under investigation; (3) the person being tested can be proved or assumed to have had prior contact with substance eliciting the reaction, or with a substance belonging to same immunobiologic or chemical group; (4) a control or controls elicit no reaction.

A reaction is of clinical significance only when these four criteria have been fulfilled and when, in addition, the following facts are established: (1) The substance eliciting the positive test is one which the clinical findings point to as a possible factor in the causation of the disease; (2) elimination of contact with the substance brings about amelioration or cure, and (3) renewed contact with the substance causes a recurrence or exacerbation of the clinical disease. I believe that

2a. In the editorial on this subject which appeared in THE JOURNAL, Aug. 12, 1933, page 527, it was stated that the positive tests in these cases were obtained by the patch method. This is an error. The positive reactions were of immediate wheal and erythema type, in response to intradermal tests; that is, they were not epidermal but vascular.

3. Harkavy, Joseph: Tobacco Sensitiveness in Thrombo-Angiitis Obliterans, Migrating Phlebitis and Coronary Artery Disease, Bull. New York Acad. Med. **9**: 318 (May) 1933. Harkavy, Joseph; Hebald, S., and Silbert, S.: Tobacco Sensitiveness in Thrombo-Angiitis Obliterans, Proc. Soc. Exper. Biol. & Med. **30**: 104 (Oct.) 1932.

4. Sulzberger, Marion B.: Recent Immunologic Experiments in Tobacco Hypersensitivity, Bull. New York Acad. Med. **9**: 294 (May) 1933.

5. Sulzberger, Marion B., and Wise, Fred: The Contact or Patch Test in Dermatology, Arch. Dermat. & Syph. **23**: 519 (March) 1931.

by adhering rigidly to these criteria immunologists may avoid the most important sources of error in judging tests of the skin and thus also in the future avoid much of the criticism to which this method of investigation has been subjected.

As far as I can see, the postulates mentioned have, to a great degree, been fulfilled in thrombo-angiitis obliterans. It is too well known to require further discussion that the occurrence of this disease is in most instances, intimately connected with tobacco smoking. Many of the patients are excessive smokers. Cessation of smoking tends to arrest the pathologic progress, and resumption of smoking often causes renewed activity.

That tobacco smoking causes a sensitization to tobacco seems to me to be proved, as before stated, by the higher percentage of reactions of the skin found in smokers than in nonsmokers; and that this sensitivity is present in a strikingly high frequency in thrombo-angiitis obliterans is shown by the figures I have quoted. The pathologic processes in thrombo-angiitis obliterans are localized in the blood vessels, and the reaction of the skin observed in the positive test is, though evanescent, also vascular.

The tobacco allergens I employed were not primary irritants, and the positive reactions of the skin noted must have been due to sensitization. One is forced to this conclusion when one considers that 84 per cent of nonsmokers and 64 per cent of smokers show not the slightest trace of reaction to the tobacco allergen.

As a result of my experiments and in conjunction with previous clinical experience, I feel that I may safely advance the opinion that the positive reactions of the skin to tobacco found in thrombo-angiitis obliterans are highly suggestive of this condition, being in most cases connected in some way with a hypersensitivity of certain parts of the vascular system to circulating allergens contained in or derived from tobacco.

My second group of experiments investigated the question of whether thrombo-angiitis obliterans was accompanied by a sensitization of the skin to tobacco alone or to tobacco and other allergens. With the assistance of Drs. E. Feit, H. H. Gelfand, N. N. Smith and L. Mamelok, eighteen of the patients with thrombo-angiitis obliterans were tested with a large number of common allergens in addition to tobacco. In one case there were no cutaneous reactions whatsoever; two patients gave negative reactions to tobacco but marked reactions to other inhalants (dust, feathers, kapok and cat hair); fifteen patients were positive to tobacco, but many not to tobacco alone, there being ten cases in which some other allergen or allergens also caused definite positive reactions of the skin. The additional positive reactions in this group were caused by foods and inhalants, dust being the principal one (eight positive reactions to dust, two positive reactions to ragweed, six positive reactions to barley and five positive reactions to oats). I therefore conclude that patients with thrombo-angiitis obliterans have a polyvalent sensitivity of the vascular apparatus of the skin to various excitants which includes, beside tobacco, other inhalants and also foods. This speaks in favor of thrombo-angiitis obliterans as a disease of sensitization. As is known from experience, sensitizations caused by one substance tend to lose their monovalence and become polyvalent, with a sensitivity of the skin embracing many substances which may or may not be of clinical significance. Unless thrombo-angiitis obliterans is a disease of sensitization, it would be a hitherto unprecedented finding to have such a large number of positive skin reactions in patients not within the atopic group. (I did not find thrombo-angiitis obliterans to be an atopic disease.)

These results also explain why typical thrombo-angiitis obliterans can occur in nonsmokers. All I should like to say of the disease at present is that if it is, as I believe it to be, a hypersensitivity, this hypersensitivity is in most, but by no means in all, cases due to tobacco. Other substances can, in all probability, cause the same picture, and this again coincides with the rule in other forms of hypersensitivity. I know of no clinical manifestation of hypersensitivity which is invariably caused by one particular substance, and by that substance alone in all cases. (For instance, spirochetes or lepra bacilli can sometimes cause histologic tubercles not to be differentiated from those seen in the usual reactions to tubercle bacilli or their products. Ragweed and timothy account for most cases of atopic vasomotor rhinitis in or about New York City, but an occasional nonseasonal but otherwise clinically identical case will be seen which is caused by another inhalant, such as orris root or by a food, such as milk.) The two patients who gave negative reactions to tobacco but marked reactions to other inhalants seem to be peculiarly significant in this respect. Such cases require further study, in particular as to whether one or more of the substances eliciting the positive skin reaction may not be of clinical or etiologic importance.

In a third group of experiments, in collaboration with Dr. E. Feit, I investigated the relationship of the form of hypersensitivity demonstrated in thrombo-angiitis obliterans with other forms of human hypersensitivity, in particular with atopy. We found no proof that there was any relationship between the hypersensitivity of thrombo-angiitis obliterans and the form of hypersensitivity found in asthmas, hay fevers, some infantile eczemas and disseminated neurodermites.

The family histories of our patients with thrombo-angiitis obliterans were essentially negative for the presence of atopic diseases. The patients themselves had no atopic diseases and had no personal history of atopic disease. (Only one patient with a possible history of hay fever was found.)

Dr. Feit and I most carefully investigated our entire group of cases for reagins (passive transference antibodies, Prausnitz-Küstner antibodies) to tobacco. In spite of repeated and persistent experiments, antibodies of this type could be found in only one case. We also occasionally succeeded in demonstrating such antibodies to tobacco in other diseases. Furthermore, our patient with thrombo-angiitis obliterans with tobacco reagins had reagins to dust also. In view of this, even in the one case in which tobacco reagins were found, the findings cannot be regarded as pathognomonic.

I therefore conclude that the sensitization in thrombo-angiitis obliterans is nonatopic, for, in the material herein reported, the characteristics of atopic hypersensitivity are completely lacking (Sulzberger and Feit[6]).

Hypersensitivities with immediate wheal reactions of the skin, without atopy and without reagins, are well known in other sensitizations of human beings. Urticarial and asthmatic reactions to drugs frequently fall in this group. Sensitizations to normal horse serum (not necessarily those to immune horse serums), sensitizations to many forms of insect bites and asthmas from pediculoides ventricosus, are in this category, and thrombo-angiitis obliterans will, if my experiments are

6. Sulzberger, Marion B., and Feit, E.: Studies in Tobacco Hypersensitivity: II. Thrombo-Angiitis Obliterans with Positive Urticarial Skin Reactions and Negative Reagin Findings, J. Immunol. **24**: 425 (May) 1933.

verified, also fall in this group. (For a more complete report and discussion of these experiments, see Sulzberger and Feit [8]).

The fourth and last group of experiments I shall mention concerns the question of the nature of the sensitizing substance or substances in the heterogeneous chemical mixture known as tobacco. I cannot as yet give any definite answer to this question. This interesting analysis must be carried further by chemical and physical fractionation of tobacco extracts and by means of tests of the skin. I can state, however, that the active ingredient eliciting the positive reaction of the skin to tobacco resists moist heat of 58 C. for one hour; that it resists irradiation with unfiltered x-rays in a dosage of six erythema units; that it resists exposure to ultraviolet rays for one hour, and that it is not destroyed by boiling for one minute.

There is one further, and to my mind, new and important statement which can be made concerning the nature of the tobacco ingredient or ingredients which cause the reaction of hypersensitivity. My experiments in what I term "immunobiologic analysis" lead me to conclude that, in general, the reaction is caused by parts of the tobacco other than nicotine. So far as the immunologic effects of tobacco are concerned, nicotine seems to play either no rôle or a negligible one. I have been using patch tests with tobacco and with nicotine solutions for many years, and while I have seen several eczematous reactions to tobacco extracts, I have seen none to nicotine (Stauffer [7]). In the course of intradermal testing with tobacco extracts and with nicotine, I have seen not a few late tuberculin type of reactions appear at the site of application of tobacco, but none at the site of application of nicotine. (The significance of this late tuberculin type of reaction to tobacco is, as yet, unknown and unstudied.)

In regard to the urticarial wheal reactions which here concern us primarily, I have found that nicotine is surprisingly inactive and innocuous. I have published elsewhere (with E. Feit and B. Scholder) a comparison of immediate reactions elicited by denicotinized tobacco extracts and by a strong solution of nicotine sulphate (0.4 per cent). In the twenty-five cases published (thirteen were patients with thrombo-angiitis obliterans), only one showed a slight reaction at the nicotine test site. In all the other cases, the denicotinized tobacco site caused a reaction of the skin definitely stronger than that at the site of the injection of the pure nicotine (Sulzberger [8]).

Since the publication of these twenty-five cases, I have continued to test with denicotinized tobacco and with the nicotine solution. While my collaborators and I have seen many hundreds of positive reactions to tobacco, we have observed only two cases in which there were slight to moderate reactions to nicotine.

It is obvious that as soon as one regards the pathologic effects of tobacco as possibly due to sensitization, it is no longer necessary to attribute its deleterious action to any alkaloid or poison it may contain. (See the aforementioned fourth immunologic concept, which refers to the almost universally harmless, nontoxic and nonpoisonous nature of allergens.)

It is well known that all attempts experimentally to reproduce and study the harmful effects of tobacco, which are often so evident clinically in smokers, have failed. These attempts have, to my knowledge, been made without employing the method of sensitizing the test object or experimental animal. Many of them were purely toxicologic experiments with nicotine, and these often resulted in such manifest failures that many observers have sought to find poisons other than nicotine on which to blame the damage caused by smoking.

A voluminous literature exists which treats of poisons other than nicotine, to be found in tobacco smoke (pyridine bases, furfurol and carbon monoxide). In my opinion, this entire phase of research in tobacco smoke sprang into being because of the failure of the experiments with nicotine and because experimenters, not considering the possibility of sensitization, found it necessary to search for other poisons. So far as I know, none of the other poisons has been proved to reproduce the harmful effects of smoking.

All of these failures speak, to my mind, in favor of sensitization mechanisms being at play in the pathologic conditions clinically so evidently due to tobacco.

The concept of tobacco becoming harmful through sensitization will, I hope, be fruitful in the future. If correct, its application should enable investigators experimentally to reproduce and study the effects of tobacco, by sensitizing the experimental object. This will be a decided advance and may lead to results of great practical value. This immunologic approach may lead to the discovery of the sensitizing ingredient or ingredients in tobacco, and this perhaps to a method for eliminating or destroying the harmful factor.

SUMMARY AND CONCLUSIONS

The studies herein reported were carried out, in the main, by means of intradermal tests of the skin with tobacco extracts and with nicotine in cases of thrombo-angiitis obliterans.

Six concepts of fundamental immunologic nature form the basis of the hypothesis that some cases of certain diseases of the vascular system (thrombo-angiitis obliterans, angina pectoris and coronary disease), clinically long considered to be in some way connected with smoking, are manifestations of hypersensitivity in certain segments of blood vessels to circulating allergens derived from or contained in tobacco.

Concept 1. There is localized and circumscribed fixed specific hypersensitivity; i. e., a hypersensitivity confined to a certain organ or part of an organ may develop.

Concept 2. There is a predilection of certain allergens to sensitize and elicit reactions in certain tissues; i. e., whereas any allergen may sensitize any part, almost all allergens have their favorite point of attack.

Concept 3. Not only sudden and evanescent reactions are elicited when the excitant meets the specifically sensitized shock tissue, but chronic reactions and permanent organic damage are often caused by one or successive shocks resulting from such encounters.

Concept 4. There is an idiosyncrasy, meaning that certain persons react in a manner different from that of the norm; allergens causing reactions in the idiosyncratic person cause no reactions in normal persons. Allergens are thus usually of harmless nature and are not poisons or toxins in the pharmacologic or toxicologic sense.

Concept 5. The vascular system in man seems to be peculiarly susceptible to sensitizations and is thus most frequently the seat of reactions. Examples of this are found in many diseases of the skin. The wheal reaction is, in itself, a demonstration of vascular hypersensitivity.

7. Stauffer, Hans: Die Ekzemproben, Arch. f. Dermat. u. Syph. **162**: 517, 1930.
8. Sulzberger, Marion B.: Studies in Tobacco Hypersensitivity: I. Comparison Between Reactions to Nicotine and to Denicotinized Tobacco Extract, J. Immunol. **24**: 85 (Jan.) 1933.

Concept 6. The skin is useful as a test tissue in a great variety of hypersensitivities of internal organs.

The experiments in patients with thrombo-angiitis obliterans and in controls have brought to light the following data: Seventy-eight per cent of the patients with thrombo-angiitis obliterans tested had positive reactions of the skin to tobacco; 36 per cent of the smokers without thrombo-angiitis obliterans and 16 per cent of the nonsmokers gave positive reactions.

The persons afflicted with thrombo-angiitis obliterans were not atopic, and there were no regularly demonstrable reagins in their serums.

As the positive skin tests in patients with thrombo-angiitis obliterans correspond with the clinical evidence incriminating tobacco, these results are regarded as highly suggestive that sensitization of the vascular system to tobacco may play a causal or contributory rôle in many cases of thrombo-angiitis obliterans.

Although tobacco was the principal allergen causing positive reactions of the skin in thrombo-angiitis obliterans, other allergens and, notably, inhalants also elicited positive responses.

It is assumed that cases of thrombo-angiitis obliterans must exist in which other excitants and not tobacco are the major factors.

That part of the tobacco which elicits the skin reaction of hypersensitivity is coctostable and thermostable and is not destroyed by ultraviolet rays or x-rays in the dosages we employed. It is not nicotine.

Nicotine is of little or no importance in sensitizations to tobacco. If the diseases under discussion are sensitizations to tobacco, nicotine is, in all probability, of little or no importance in their causation.

It is hoped that the new immunologic approach and the employment of animal sensitizations will lead to the experimental reproduction of certain diseases clinically attributable to damage by tobacco. As is well known, all toxicologic attempts to do this have failed.

One of the objects of such experimental studies would be to isolate and, eventually, to eliminate the actual sensitizing factor or factors from tobacco.

ABSTRACT OF DISCUSSION

DR. GEORGE MILLER MACKEE, New York: Dr. Sulzberger's instructive, inspiring and conservative article describes his experimental work with tobacco sensitization. He has drawn conclusions some of which are based on definite facts while others are theoretical deductions. All are logical. He has made not a single dogmatic statement. The subject is open for continued investigation. Two important facts in the paper are, first, that in many instances the effects of tobacco are due to allergy to some yet unknown allergen in the plant and not to nicotine as previously believed. Various species may have different allergens, or human reactions to the same allergen may vary. The second fact is that these allergens have an affinity for the circulatory system in various parts of the body. The shock center may be in any layer of the skin or in any organ. Dermatologists are familiar with tobacco dermatitis (eczema venenatum). A continuation of this investigation may show that other types of eczema are caused by tobacco allergy. The paper calls to mind the importance of skin tests in practical work and especially in research. In spite of the enormous amount of work that has already been accomplished, the enormous possibilities of properly conducted skin tests are only beginning to be appreciated. When one is thoroughly acquainted with delayed reactions, intermittent allergy, generalized and fixed areas of sensitization, shock centers, passive transfers and polyallergy and can properly interpret the results obtained, one can obtain valuable information in cases of eczema venenatum, neurodermatitis in infants, children, adolescents and adults, urticaria, dermatophytide and other atopic and allergic conditions of the skin and other organs. I urge that every dermatologist include adequate skin testing in his office practice and that every graduate dermatologic curriculum contain a course that covers this subject comprehensively and in detail.

DR. WILLIAM ALLEN PUSEY, Chicago: I have seen Dr. Sulzberger smoking this afternoon, and therefore his conclusions are not open to the skepticism, not to say hostility, of most of the investigations by nonsmokers. His suggestions are interesting. In the first place he offers a hypothesis—the only one that I know—that is consistent with the known clinical facts concerning the effects of tobacco. His suggestions also are in accord with what is known of localized sensitizations occurring in the skin. For example, the paper this afternoon on fixed drug eruptions presents an illustration of fixed sensitization of blood vessels in the skin producing an inflammatory reaction which, when long continued, may result in vascular sclerosis; the same sort of process occurring in blood vessels sensitized to tobacco might produce a sclerosis in certain vessels of the heart or of certain vessels of the legs. Dr. Sulzberger's observations are an illustration of the light that may be thrown by the study of pathologic processes in the skin on similar processes occurring in other parts of the body.

DR. WALTER J. HIGHMAN, New York: I was impressed by the criteria and postulates by which Dr. Sulzberger so wisely controls himself in reaching his conclusions. I was impressed by his statement that the pet idea of sensitization in the great majority of instances is erroneous, that something entering the body of persons who are sensitized to many things may produce the condition called sensitization. More simply stated, Dr. Sulzberger's paper can be summed up in the maxim that one man's meat is another man's poison. Dr. Sulzberger is not a confirmed allergist and therefore not a subscriber to the allergy racket. I too think that every man should be his own allergist in every instance.

DR. PAUL A. O'LEARY, Rochester, Minn.: My colleagues Drs. George E. Brown and N. W. Barber studied the influence of cigaret paper rather than tobacco as a factor in the production of occlusive vascular disease. They used weaker dilutions of the paper extract in the skin testing of patients with Buerger's disease, with essentially negative results. The fact that Dr. Sulzberger used a concentrated tobacco extract may account for the high percentage of positive skin tests he obtained. Horton demonstrated in 40 per cent of a group with Buerger's disease a micro-organism which, when introduced into animals, reproduced occlusive vascular disease. In the Scientific Exhibit there is a demonstration showing that rye bread (ergot) is an etiologic factor in this disease. These three demonstrations suggest that the blood vessels of the individual with occlusive vascular disease may be allergic to tobacco, ergot and bacteria, and of course there may be other etiologic allergens that have not as yet been elicited. The allergists no doubt look with favor on the multiple etiologic factor concept of this disease, while to others such a concept is subject to severe criticism. Obliterating endarteritis was formerly thought to be confined to male Jews who smoked cigarets to excess. It is now found about as frequently in male Gentiles, and less frequently in women who do not smoke.

DR. WINSTON U. RUTLEDGE, Louisville, Ky.: Coming from a tobacco state and a tobacco manufacturing center, I have seen many cases of dermatitis due to contact with tobacco. I have treated several men who, when buying the loose leaf, developed in some instances generalized erythematous eruptions and others who had maculopapular eruptions involving only the exposed portions of the body and who suffered from these dermatoses only during the tobacco season. I have seen such dermatoses, both in tobacco buyers and in workers in tobacco factories. In such places they frequently develop eruptions and practically the only cure is to get the patient away from tobacco. In my experience, patch tests in such cases have been to a large extent negative, and I do not know how to account for their negativity. Dr. Cannon brought to my attention the possibility that the condition might be an arsenical dermatosis, because arsenic plays an important part in the growing of tobacco. I also had the idea that perhaps some of these eruptions were fungus disease, but I failed to demonstrate a fungus in any instance. I had one patient who did not develop a derma-

titis while working with tobacco in North Carolina, but on two occasions, while buying tobacco in Kentucky, had such an eruption. This example illustrates the statement made by one of the discussers that tobacco from different sections of the country may possess different allergic properties.

DR. MARION B. SULZBERGER, New York: I think the appliion of skin tests in many conditions in which no one has thought of applying them may lead to further knowledge. To know when, where and how to apply these tests, what substances to use, what to look for and how to study and evaluate the skin reaction is obviously a part of dermatology. Dr. O'Leary is absolutely right in saying that I did not by any means wish to imply that thrombo-angiitis obliterans is always due to tobacco sensitization. That would be against all the known facts regarding sensitization in general. I believe that many cases may perhaps be accounted for by tobacco, but there must be other cases which can be accounted for by other agents. I do not think that the factors Dr. O'Leary mentioned contradict the theory of sensitization of the blood vessels. I have seen cases of erythema nodosum, a vascular disease, due to sensitization to bromides, to bacteria and fungi, and to foods. In the cases referred to by Dr. O'Leary, there may be a vascular sensitization to bacteria, to rye or even to ergot. I realize that the riddle of thrombo-angiitis remains unsolved, just as unsolved as that of asthma, hay fever, eczematous dermatitis or drug eruptions. Even when a disease is known to be a sensitization, and the allergen is recognized, there remain the questions Why does this person become sensitized? and Why to this particular substance? and Why does he react with this or that shock tissue and in this or that specific manner? Dr. Highman has frequently discussed these points. Here the neurologic, endocrine, constitutional, vasomotor chaos is still without even a nebular hypothesis.

TREATMENT OF CHRONIC HEART DISEASE BY LOWERING THE METABOLIC RATE

THE NECESSITY FOR TOTAL ABLATION OF THE THYROID

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In several previous communications the treatment of chronic intractable heart disease by removal of the thyroid gland in toto was demonstrated as a feasible and effective procedure in patients without clinical or pathologic evidence of thyrotoxicosis.[1] The success of this type of therapy was the logical result of an extended series of observations on the circulation in chronic heart disease, hyperthyroidism and myxedema,[2] from which the conclusion had been drawn that by reducing the basal metabolic rate one would lessen the demands on the circulation and relieve the diseased heart of its burden. These considerations were equally applicable to congestive failure and angina pectoris.[3] The permanent reduction of the metabolic rate was accomplished by surgical removal of the entire thyroid gland, according to the technic developed by Berlin and first performed by him, Dec. 15, 1932. This is the first time that a total ablation of the normal thyroid gland for chronic heart disease of nonthyrogenous origin had ever been performed.[1b]

Several investigators had in occasional instances performed subtotal thyroidectomy for relief of chronic heart disease because of the obvious benefits this operation had conferred on hearts embarrassed by a state of hyperthyroidism. These cases presented clinical signs or symptoms of thyrotoxicosis and a heightened basal metabolic rate or showed improvement after compound solution of iodine; the gland, however, in some cases appeared normal grossly and microscopically.[4] It is well known that subtotal thyroidectomy reduces the abnormally high basal metabolic rate of thyrotoxicosis to normal;[5] there is no evidence in the literature, however, that subtotal thyroidectomy can be relied on to produce a permanently subnormal basal metabolic rate. The previous work failed to justify subtotal thyroidectomy as a valid therapeutic measure for the relief of nonthyrogenous disabling heart disease.

In the first two cases[1a] that engaged our interest, only transient relief was obtained by subtotal thyroidectomy, the period of relief paralleling the curve of decline in the basal metabolic rate. Even though maximal subtotal thyroidectomy was done in these two cases, we failed in our primary purpose to reduce permanently the basal metabolic rate. Even if success might occasionally attend subtotal thyroidectomy, it became apparent that nothing but complete removal of every vestige of thyroid tissue would insure a permanent subnormal metabolic rate and clinical improvement.[1a] Total ablation of the thyroid gland in the treatment of chronic heart disease through the persistent lowering of the basal metabolic rate has now been demonstrated to be effective in over fifty cases at the Beth Israel Hospital.

The desirability of permanently lowering the metabolic rate by means less drastic than surgery presented itself. The possibility of producing this effect by irradiation was therefore considered. As far as we know, the effect of irradiation of the normal thyroid gland of man on the metabolic rate had not previously been investigated.

Roentgen radiation was also employed in two patients in whom maximal subtotal thyroidectomy had been

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This is the fourth study of the treatment of chronic heart disease by producing a subnormal metabolic rate in patients with no evidence of thyrotoxicosis.

1. (a) Blumgart, H. L.; Levine, S. A., and Berlin, D. D.: Congestive Heart Failure and Angina Pectoris: The Therapeutic Effect of Thyroidectomy on Patients Without Clinical or Pathologic Evidence of Thyroid Toxicity, Arch. Int. Med. **51**: 866 (June) 1933. (b) Berlin, D. D.: The Therapeutic Effect of Thyroidectomy on Congestive Heart Failure and Angina Pectoris in Patients with no Clinical or Pathological Evidence of Thyroid Toxicity: II. Operative Technic, Am. J. Surg. **21**: 173 (Aug.) 1933. (c) Blumgart, H. L.; Riseman, J. E. F.; Davis, David, and Berlin, D. D.: Therapeutic Effect of Total Ablation of Normal Thyroid on Congestive Heart Failure and Angina Pectoris: III. Early Results in Various Types of Cardiovascular Disease and Coincident Pathologic States Without Clinical or Pathologic Evidence of Thyroid Toxicity, Arch. Int. Med. **52**: 165 (Aug.) 1933.

2. Blumgart, H. L., and Weiss, Soma: Studies on the Velocity of Blood Flow: II. The Velocity of Blood Flow in Normal Resting Individuals and a Critique of the Method Used, J. Clin. Investigation **4**: 15 (April) 1927; VII. The Pulmonary Circulation Time in Normal Resting Individuals, ibid. **4**: 399 (Aug.) 1927. Blumgart, H. L.; Gargill, S. L., and Gilligan, D. R.: Studies on the Velocity of Blood Flow: XIII. The Circulatory Response to Thyrotoxicosis, ibid. **9**: 69 (Aug.) 1930; XIV. The Circulation in Myxedema with a Comparison of the Velocity of Blood Flow in Myxedema and Thyrotoxicosis, ibid. **9**: 91 (Aug.) 1930.

3. Blumgart, H. L.; Gargill, S. L., and Gilligan, D. R.: Studies on the Velocity of Blood Flow: XV. The Velocity of Blood Flow and Other Aspects of the Circulation in Patients with "Primary" and Secondary Anemia and in Two Patients with Polycythemia Vera, J. Clin. Investigation **9**: 679 (Feb.) 1931. Blumgart, H. L.: The Velocity of Blood Flow in Health and Disease. The Velocity of Blood Flow in Man and Its Relation to Other Measurements of the Circulation, Medicine **10**: 1 (Feb.) 1931.

4. Crile, George: The Treatment of Certain Types of Hyperthyroidism, Tr. Am. A. Study Goiter **1**: 1, 1932. Boas, E. P., and Shapiro, Shepard: Diastolic Hypertension with Increased Basal Metabolic Rate, J. A. M. A. **84**: 1558 (May 23) 1925; Further Observations on Patients with Hypertension and Increased Basal Metabolic Rate, Am. Heart J. **1**: 643 (June) 1926. Rose, Edward: Malignant Hypertensive Vascular Disease Simulating Hyperthyroidism: Clinical Course Following Maximal Subtotal Thyroidectomy, M. Clin. North America **16**: 261 (July) 1932. Levine, S. A.; Cutler, E. C., and Eppinger, E. C.: Thyroidectomy in the Treatment of Advanced Congestive Heart Failure and Angina Pectoris, New England J. Med. **209**: 667 (Oct. 5) 1933.

5. Means, J. H., and Richardson, E. P.: The Diagnosis and Treatment of Diseases of the Thyroid, in Christian, H. A.: Oxford Monographs on Diagnosis and Treatment, New York, Oxford University Press **4**: 1929. Pfahler, G. E., and Vastine, J. H.: Results of Roentgen Therapy in Goiter: Four Hundred Cases, Am. J. Roentgenol. **24**: 395 (Oct.) 1930.

done without benefit. It seemed reasonable to expect that the minute amount of thyroid tissue left after surgery might become hypertrophied and would be more readily influenced by irradiation than an entirely normal gland.

REVIEW OF LITERATURE

Roentgen therapy has been used for many years in the treatment of toxic goiter and a malignant condition of the thyroid. Pfahler and Vastine [5] reviewed 400 cases of goiter treated by roentgen radiation. These cases were grouped to include 13 cases of simple or colloid goiter; 241 cases of hyperplastic goiter, of which 238 were exophthalmic; 118 cases of adenomatous goiter, of which 92 were nontoxic and 26 toxic; 2 cases of nonsuppurative thyroiditis; and 26 cases of carcinoma of the thyroid gland. The roentgen factors employed in giving the treatments to this group of cases were 9 inch spark gap, 5 milliamperes, 6 mm. of aluminum filter and 10 inch target distance, 50 per cent of an erythema skin dose being given through each of four portals directed to the gland. This was repeated in three weeks, from six to eight series of treatments being given. As a result of this treatment, hypothyroidism developed in four cases, or 1.7 per cent. Holmes and Means,[6] Simpson,[7] Jenkinson,[8] and Groover and his associates [9] obtained similar results, and Groover likewise reported that hypothyroidism was produced in 1.3 per cent of his cases. Bowing [10] of the Mayo Clinic treated 167 cases of thyroid cancer by radiation alone, or radiation and surgery. Two cases of myxedema developed in his series. The development of myxedema in these patients may not have been due to irradiation but may simply represent the incidence of spontaneous myxedema in any representative group of thyrotoxic patients who are followed over a period of time without specific treatment.[11] Ginsburg [12] reported that he treated 500 goiter patients with radium, as much as 6,000 mg. hours being given to the gland in a single dose, with no evidence of myxedema. Since our own results in the treatment of toxic goiter were similar to the results obtained by the aforementioned authors, we were led to believe that the production of myxedema by irradiation of the normal thyroid would be difficult.

METHODS AND RESULTS

In the treatment of toxic goiter, 800 roentgens measured without backscatter, directed to the gland (160 roentgens being given every other day for five days), is usually sufficient to lower the metabolic rate. Occasionally, this dose must be repeated. The factors used in our first group of four cases were the same as those employed in patients with toxic goiter, as shown in the accompanying table. The total roentgens, however, amounted to twice and sometimes three times the usual dosage. This was considerably more than that used by Pfahler and Vastine.[5] The metabolic rates of these patients, as will be shown, were not influenced. Two of the four patients had had a subtotal thyroidectomy, with nine tenths or even more of the thyroid gland removed before roentgen therapy was instituted. As already noted, irradiation had no effect on these two cases, indicating that it would be difficult or impossible to produce permanent myxedema by irradiation with the doses given.

In view of these results, even larger dosage was given. Our experience in the treatment of cancer of the larynx led us to believe that we might be able to influence the normal thyroid by the Coutard method, which consists in giving heavily filtered roentgen radiation over a longer period of irradiation hours. Accordingly, two patients were treated with the Coutard [13] dosage applied to the gland through one portal, 4,000 roentgens measured without backscatter being administered, as shown in the table. In cases 5 and 6, treated by this method, the typical epidermitis and the epithelitis of the trachea developed, which lasted for a period of two weeks following the last treatment. No significant change in their metabolic rates was noted, however, over a period of three months after the last treatment.

Roentgen Therapy in Six Cases

Case	Number of Treatments	Duration of Therapy, Days	Roentgen Units
1	18	63	1,800
2	18	44	1,800
3	13	14	2,080
4	10	11	1,600
5	19	19	4,000
6	19	19	4,000
Usual therapy for toxic goiter	5	10	800

Roentgen factors used:
Cases 1-4: 200 kilovolts, 4 milliamperes, 5 mm. of copper, 1 mm. of aluminum, 50 cm. distance.
Cases 5-6: Same except for filters: 2 mm. of copper, 1 mm. of aluminum.

The basal metabolic rate measurements were made by means of a Collins-Benedict Roth machine and were always done in duplicate.

REPORT OF CASES

CASE 1.—*Hypertensive heart disease, coronary disease and congestive failure of two and one-half years' duration.*

I. B., a man, aged 45, admitted to the Beth Israel Hospital, Sept. 15, 1932, had a history of dyspnea on exertion of two years' duration. On one occasion, soon after the onset of his illness, he suffered one severe attack of precordial pain lasting ten minutes. He was first admitted to the Beth Israel Hospital two years previously and at that time showed signs of pulmonary congestion, ascites, and a vital capacity of 2,000 cc. An electrocardiogram showed inverted T waves in leads 1 and 2 and prolonged auriculoventricular conduction. The blood pressure was 176 systolic, 100 diastolic; his basal metabolic rate was plus 3. He improved, was discharged, and did fairly well until eight months before the present admission, when he was again forced to bed. In spite of remaining in bed most of the time, he became progressively worse.

On admission he showed severe dyspnea, orthopnea of necessity, and deep cyanosis of the lips and mucous membranes. The heart was moderately enlarged; there was a gallop rhythm, and the rate was 100. The blood pressure was 180 systolic, 110 diastolic. There were signs of congestion over both lung fields posteriorly and fluid at the left base. Ascites and moderate pitting edema of the legs, hands and forearms were evident. The basal metabolic rates, September 9 and October 4, were plus 9 and plus 7 per cent of normal. October 17, a maximal subtotal thyroidectomy was performed, in which more than nine tenths of the normal gland was removed.[14] The

6. Means, J. H., and Holmes, G. W.: Further Observations on the Roentgen-Ray Treatment of Toxic Goiter, Arch. Int. Med. **31**: 303 (March) 1923.

7. Simpson, C. A.: X-Ray Treatment of Hyperthyroidism and Toxic Goiter, Radiology **3**: 427, 1924.

8. Jenkinson, E. L.: Thyroid Disease, Radiology **4**: 453 (June) 1925.

9. Groover, T. A.; Christie, A. C.; Merritt, E. A.; Coe, F. O., and McPeak, E. M.: Roentgen Irradiation in the Treatment of Hyperthyroidism, J. A. M. A. **92**: 1739 (May 25) 1929.

10. Bowing, H. H.: Malignant Tumors of the Thyroid Gland Treated by Operation, Radium and X-Rays, Am. J. Roentgenol. **18**: 501 (Dec.) 1927.

11. Holmes, G. W.: Personal communication to the authors.

12. Ginsburg, Solomon: The Value and Place of Radium in the Treatment of Diseases of the Thyroid Gland, Am. J. Roentgenol. **24**: 283 (Sept.) 1930.

13. Coutard, H.: Roentgen Therapy of Epitheliomas of the Tonsillar Region, Hypopharynx and Larynx from 1920 to 1926, Am. J. Roentgenol. **28**: 313 (Sept.) 1932.

14. This operation, as well as all others in this investigation, was performed by Dr. David Berlin.

basal metabolic rates on November 1, 2, 3, 4, 8, 12 and 18 were minus 12, minus 6, minus 18, minus 15, minus 12, minus 14 and minus 12, respectively. During this period the patient showed clinical improvement. The basal metabolic rate then began to rise gradually, reaching plus 2, December 3. From this time on, clinical improvement was not sustained and the patient again showed an increase in the signs of congestive failure. An unsuccessful attempt was made subsequently to remove the remaining fragments of thyroid tissue by surgical intervention. Dense connective tissue adhesions obscured the anatomic landmarks and made any surgery hazardous.

Roentgen treatment was instituted, December 27, and continued to Feb. 9, 1933. During the period of treatment the metabolic rate at intervals of days was minus 2, minus 11, minus 7, minus 8, minus 14, minus 3 and minus 14 per cent. On July 13 and 15, approximately five months after treatment, the metabolic rates were plus 8 and plus 6 per cent.

During the past few months the patient has continued to show evidence of congestive failure, with complete incapacity, and he is now confined to bed rest in a hospital for chronic diseases.

CASE 2.—*General arteriosclerosis, arteriosclerotic heart disease, auricular fibrillation, and congestive heart failure of two and one-half years' duration.*

H. B., a man, aged 59, was admitted to the Beth Israel Hospital, Nov. 1, 1932, for the fifth time in two and a half years, because of edema of the legs, pain in the right upper quadrant and shortness of breath. His last discharge from the hospital was six months before that admission, at which time the diagnoses were arteriosclerotic heart disease, auricular fibrillation, congestive failure and Paget's disease. He had been confined to bed practically the entire time, and the signs and symptoms of congestive failure had become progressively more pronounced.

Physical examination showed cyanosis, orthopnea, grossly irregular heart action and an enlarged heart. Both lungs were congested, and the liver was enlarged and tender. Moderately deep pitting edema was present over both lower legs, feet and the sacrum. The blood pressure was 140 systolic, 70 diastolic. The seven foot roentgenogram of the chest showed the transverse cardiac diameter to be 22.1 cm.; the internal chest diameter, 29.4 cm. Electrocardiographic tracings showed auricular fibrillation and bundle branch block.

November 23, a maximal subtotal thyroidectomy was performed, more than nine tenths of the gland being removed. The basal metabolic rate fell from an average of minus 4 to minus 15 per cent, with concomitant clinical improvement. Following this, however, he again began to gain edema, and the metabolic rate rose to the preoperative level.

Roentgen treatment was begun, December 27, and continued until March 1, 1933. During the course of the treatment the metabolic rates progressively fell from minus 4 to minus 21 per cent but quickly returned to previous levels shortly after the last treatment. March 3, 6, 15 and 23 the metabolic rates were plus 1, plus 13, plus 24 and plus 9 per cent. On July 29, approximately five months after the termination of treatment, the basal metabolic rate was minus 8 per cent of normal. The patient continued to show evidence of congestive failure. During the past two months the signs and symptoms of circulatory failure have increased, so that at the present time he is confined to bed with general anasarca.

CASE 3.—*Angina pectoris, of four years' duration.*

O. H., a man, aged 68, was admitted, Feb. 21, 1933, complaining of attacks of substernal pain during the previous four years. The pain was severe, was viselike, would often radiate to the left arm, was precipitated by exertion, and was immediately relieved by rest or glyceryl trinitrate. These attacks gradually increased in severity and frequency and in the previous two months appeared even on rest. There was no significant dyspnea, no cough and no edema. One year before admission he was told that he had diabetes, and three months before he developed a mild left hemiplegia from which he had almost entirely recovered.

Physical examination showed moderately advanced arteriosclerosis of the retinal and peripheral vessels. The thyroid gland was of normal size. The chest was somewhat emphysematous; the lungs were clear. The heart was moderately enlarged; the sounds were of fair quality and regular. There were no murmurs. There was no edema. The blood pressure was 160 systolic, 90 diastolic. A seven foot roentgenogram showed moderate cardiac enlargement and calcification of the aorta. The electrocardiogram showed inverted T waves in leads 1 and 2.

Because of the patient's age, the history of a recent cerebral accident, and the marked coronary sclerosis, it was felt that he was a poor surgical risk for total ablation of the thyroid gland, and roentgen therapy was instituted in the hope of accomplishing a lowering of the metabolic rate by this means.

Basal metabolic rates, February 23, March 1 and 2, 1933, were minus 16, minus 10 and minus 22 per cent. Roentgen treatment over the thyroid gland was instituted, March 6, and continued until March 20. Thirteen treatments were given at daily intervals, seven directed to the left and six to the right aspect of the neck. Each treatment consisted in giving 200 kilovolts, 4 milliamperes, through a filter of 0.5 mm. of copper and 1 mm. of aluminum from a distance of 20 inches for a period of twenty minutes, with a total dosage of 2,080 roentgens. The basal metabolic rate, March 13, was minus 13 per cent; July 15 and 16, plus 12 and 0 per cent of normal. The patient continued to have frequent attacks of angina pectoris, and after being studied at the Boston Dispensary for several months and given every available treatment, he has shown no improvement.

CASE 4.—*Rheumatic heart disease, mitral stenosis and insufficiency, auricular fibrillation and congestive heart failure of two and one-half years' duration.*

S. M., a man, aged 33, admitted to the Beth Israel Hospital, Jan. 30, 1933, complained of dyspnea, orthopnea and weakness of two and a half years' duration. He was first admitted to the hospital, May 5, 1930, complaining of cough, tightness in the chest, dyspnea, palpitation and blood-streaked sputum of five weeks' duration. Physical examination showed cyanosis, orthopnea, enlarged heart and the signs of mitral stenosis and insufficiency. During the two years following his first admission his activity became increasingly limited, and signs of congestive failure gradually progressed.

Physical examination at the time of the present admission revealed moderate cyanosis of the lips, dulness at both lung bases, marked cardiac enlargement, and grossly irregular heart sounds. The liver was enlarged four fingerbreadths below the costal margin. There was no pitting edema. The blood pressure was 185 systolic and 90 diastolic. A seven foot roentgenogram of the chest showed a transverse cardiac diameter of 25.4 cm. and an internal chest diameter of 27.6 cm.

Roentgen treatments were given from February 3 until February 14, a total of 1,660 roentgens being directed to the thyroid gland. The basal metabolic rates, February 1 and 8, were plus 6 and plus 1 per cent respectively. The metabolic rate on February 15, after treatment, was plus 3 per cent.

During his stay in the hospital the patient's condition failed to improve. He was discharged, February 18, and died suddenly one week after discharge.

CASE 5.—*Rheumatic heart disease, mitral stenosis, auricular fibrillation and congestive failure. (No improvement after irradiation of the thyroid gland; definite improvement after subsequent total ablation of the thyroid.)*

S. B., a woman, aged 46, admitted to the Beth Israel Hospital, April 24, 1933, had had rheumatic fever twenty-five years before, at which time she was told that she had heart trouble. Since that time she had suffered from palpitation and dyspnea on exertion, and on rare occasions she had had slight swelling of the ankles after being up and about for a considerable period of time. During the twelve months previous to her present admission, dyspnea, orthopnea and palpitation had become more pronounced.

When she was first admitted to the hospital, Aug. 12, 1932, physical examination revealed slight dyspnea, some dulness at the right base, cardiac enlargement, grossly irregular heart action, and a rough diastolic murmur at the apex. In the epigastrium there was a mass, apparently the liver, which was slightly tender. There was no pitting edema of the extremities. During her stay she developed a transient hemiplegia, which cleared up after a few days. She was discharged, but readmitted, April 24, 1933, for roentgen irradiation of the thyroid gland.

Roentgen treatments were given from May 3 to May 24, 1933, the Coutard method of irradiation being employed, directed through one portal over the thyroid gland, with a total dosage of 4,000 roentgens. The metabolic rates before treatment on April 25, 26, 27 and 29 were plus 1, plus 14, plus 8 and plus 11 per cent of normal, respectively. The basal metabolism was plus 30 per cent, May 13, plus 7 per cent, June 1, and plus 1 per cent, August 3.

During the three months following the institution of treatment her condition remained approximately unchanged. The patient was apparently comfortable as long as she stayed in bed, but she had practically no capacity to be on her feet and developed symptoms on the slightest exertion. For this reason she was readmitted to the hospital and, August 9, total ablation of the thyroid gland was performed. In the course of the operation, numerous delicate adhesions were found between the capsule of the gland and the surrounding tissue. The gland weighed 11.5 Gm. On section, the cut surface was reddish brown, and numerous fibrous striations were seen. Microscopic examination of the tissue revealed alveoli well filled with pink-staining colloid. These alveoli were lined by flattened cuboidal epithelium. The outlines of the alveoli were regular and round and did not reveal any infolding or papillary projections. There was some increase in the amount of connective tissue surrounding the alveoli. Lymphocytic foci were evident. All stages of degeneration were seen. In one area there was a small group of cells composed of vacuolated cytoplasm with large vesicular nuclei. The diagnosis was a normal thyroid.

The patient made an uneventful recovery after operation and showed conspicuous improvement. Palpitation disappeared, and she became less orthopneic. Two weeks after operation she was permitted out of bed and noted that her breathing was considerably easier with mild exertion. Two months after operation clinical improvement continued. She was up and about without evidence of dyspnea. There was no sign of congestive failure. The basal metabolic rate had been permanently lowered and she had begun to show mild signs of myxedema.

CASE 6.—*Rheumatic heart disease, mitral and aortic stenosis, auricular fibrillation and congestive failure of three years' duration.*

M. B., a woman, aged 38, was admitted, April 23, 1933, for the third time in three years because of rheumatic heart disease, mitral and aortic stenosis and insufficiency, auricular fibrillation, congestive failure and diabetes. She had had repeated attacks of congestive failure in the past, and she was first told nine years before that she had heart disease. During the past three years there had been marked limitation of her reserve, with dyspnea on moderate exertion. A few days before admission she complained of "hot flashes," dry cough and palpitation, but there was no shortness of breath or edema.

Physical examination showed a cherry-red cyanosis of the face and lips, cardiac enlargement, the typical murmurs of mitral stenosis and aortic insufficiency, grossly irregular heart sounds, a blood pressure of 140 systolic, 70 diastolic, nontender enlargement of the liver to three fingerbreadths below the costal margin, and no edema. A seven foot roentgenogram of the chest showed the transverse diameter of the heart 17.9 cm., and the internal chest diameter 26.1 cm.

The patient refused operation and, accordingly, roentgen irradiation of the thyroid gland was instituted, May 3, and continued to May 24, the Coutard method being employed, one portal over the thyroid gland, with a total dosage of 4,000 roentgens. Seven tests of the basal metabolic rate from March 31 to April 28 averaged plus 2.8 per cent. The basal metabolic rates on May 29 and June 1 were minus 7 and plus 8 per cent, respectively.

During the past few months the patient has shown no significant change in her cardiac condition.

COMMENT

Total surgical ablation of the thyroid gland, which has now been performed at the Beth Israel Hospital in more than fifty cases presenting congestive failure or angina pectoris, produces persistent lowering of the basal metabolic rate and definite clinical improvement. In the hope that irradiation of the normal thyroid gland might be useful as a substitute for surgery or as an adjunct to subtotal thyroidectomy, the foregoing study was made. Cases 1 and 2 were the first cases in which operation was done (same as cases 1 and 2 of the first communication [1a]). At this time the importance of removing every bit of thyroid tissue was not appreciated, nor had the technic been evolved by Berlin.[1b] In these initial operations all thyroid tissue was removed with the exception of the minute amounts at the upper poles and in the tracheo-esophageal sulci. Such maximal subtotal thyroidectomy produced only temporary lowering of the metabolic rate and temporary clinical improvement. After success attended the first complete ablation of the thyroid (case 3 of first communication [1a]), a subsequent attempt was made to remove the remaining fragments of tissue in case 1, in which there had been a relapse to the preoperative clinical condition. Dense adhesions were encountered, which made identification of thyroid fragments impossible. It was felt that any surgical dissection would have been extremely dangerous because of the difficulty of identification and consequent likelihood of injury to the parathyroid glands or recurrent laryngeal nerves. Since the clinical condition of both patients was unimproved, heavy dosages of roentgen radiation were employed, but without effect.

The effects of roentgen irradiation were also studied in four other cases in which operation was contraindicated. These cases failed to show any clinical improvement or lowering of the metabolic rate. Operation later became feasible in one, case 4. Complete ablation of the thyroid gland was done under gas-oxygen anesthesia. Microscopic examination of the gland showed for the most part normal thyroid tissue, indicating that, in order to destroy the function of the thyroid, prohibitive dosage would be necessary. Following total ablation of the thyroid gland, the basal metabolic rate has been persistently low, and the patient has shown conspicuous clinical improvement.

These observations lead to the conclusion that little can be expected from roentgen radiation as a substitute for surgery or as an adjunct to subtotal thyroidectomy in the treatment of chronic disabling heart disease. At the present time, nothing but the complete removal of every vestige of visible thyroid tissue by surgical means will guarantee the desired persistent lowering of the metabolic rate and the consequent clinical improvement.

SUMMARY

1. Roentgen irradiation of the normal thyroid gland, used alone and also as an adjunct to maximal subtotal thyroidectomy, failed to produce any appreciable persistent lowering of the basal metabolic rate in six patients with chronic heart disease.

2. In one case, previously reported, in which a maximal subtotal thyroidectomy had been performed, both roentgen irradiation and a subsequent surgical attempt to remove the remaining fragments of the thyroid tissue were unsuccessful, and the clinical condition was not improved.

3. One patient whose condition remained the same in spite of massive irradiation showed conspicuous improvement coincident with the reduction in the basal metabolic rate when the entire thyroid gland was removed according to the technic previously described by Berlin.

4. The failure of others and of ourselves to benefit patients by subtotal thyroidectomy, our unsuccessful attempt to remove residual fragments at a subsequent

operation, and the ineffectiveness of roentgen irradiation on the remaining tissue emphasize the therapeutic importance of removing the entire gland at the time of the first operation. Ample confirmation for this conclusion was obtained by our subsequent experience in some fifty cases of angina pectoris or congestive failure, in all of which the basal metabolic rate remained low after total ablation of the thyroid gland, and in practically all of which the clinical improvement has been conspicuous.

330 Brookline Avenue.

DIVINYL ETHER

EXPERIMENTAL AND CLINICAL STUDIES

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Within the past decade a widespread interest has been shown in a variety of substances that have been recommended for surgical anesthesia. It can be said as a commonplace that, when so many substances are used for anesthesia, not one is ideal from the standpoint of the patient, the surgeon and the anesthetist. This paper is a report of our experiences with still another substance which, while not new, has only recently been suggested by Leake and his associates as an agent for surgical anesthesia.

In 1930, Leake and Chen [1] predicted from a consideration of the chemopharmacologic properties of diethyl ether and of ethylene that compounds combining the chemical characteristics of each would be interesting general anesthetic agents. Such a compound would be divinyl ether (fig. 1). Studies made by these investigators and by Knoefel, Guedel and Leake [2] seemed to bear out their prediction. Their observations indicated that divinyl ether showed great promise for qualifying as an ideal general anesthetic.

In 1931, Ruigh and Major [3] reported the successful preparation of pure divinyl ether and described its properties.

Pure divinyl ether is a clear, colorless liquid with a specific gravity of 0.77 at 20 C., and a boiling point of 28.3 C. It is as explosive and inflammable as diethyl ether and is more volatile. The divinyl ether that has been prepared for anesthesia has added to it a small amount of absolute alcohol to prevent too rapid evaporation, and an inhibiting substance to prevent decomposition. It is this mixture which we have used in our studies. Divinyl ether polymerizes on exposure to air and light and in the presence of acid decomposes to form aldehydes, one of which is formaldehyde, which is formed in very minute amounts.

Divinyl ether has a not unpleasant ethereal odor and, when pure, is not as pungent or as irritating as diethyl ether. However, when decomposed or polymerized, it has, according to Leake, a "stinging odor and causes definite local irritation." In a more recent paper, Leake, Knoefel and Guedel [4] reported that its physiologic actions were less severe than those of diethyl ether. They found no significant pathologic effect when it was administered without anoxemia. Gelfan and Bell [5] administered the anesthetic in three instances to human patients and on the basis of their observations suggested that it was worthy of a clinical trial and evaluation.

The material with which the experiments reported in this paper were conducted was supplied to us by the Laboratory of Pure Research of Merck & Co., Rahway, N. J. All the material was tested for decomposition and polymerization before its use.

We have studied the comparative effect of divinyl and diethyl ether on the blood pressure and respiration, and the concentrations of these substances in jugular vein blood at the onset of the third and fourth stages of anesthesia in dogs, and similarly in man, except that the blood was removed from a vein in the antecubital fossa during complete surgical anesthesia.

The anesthetic was administered to the dogs by inhalation through several loose layers of gauze or after tracheal cannulization and to the human patients either by open drop inhalation or in conjunction with nitrous oxide and oxygen. It will be possible in this paper to review only briefly the work we have done.

CLINICAL STUDIES

The anesthetic was not administered to the human patient until our laboratory studies were completed and we had satisfied ourselves that it could be safely administered.

The studies in the human cases were conducted in the Hospital of the University of Pennsylvania. In all, 461 patients were anesthetized. To the first fifty patients the anesthetic was administered by one of us, while the rest of the patients were anesthetized by the regular nurse anesthetists of the hospital.

The open drop method was used in about 90 per cent of the series, since we believed that with so highly volatile an anesthetic this method offered the greatest safety until we had become more experienced with the use of divinyl ether in the human patient. The method was as follows: Several loose layers of gauze were placed over the patient's face after the eyes had been covered with a piece of moistened gauze. The anesthetic was dropped slowly from a dropping bottle while the anesthetist talked to the patient and carefully observed his reactions. To the others it was administered in conjunction with nitrous oxide and oxygen through one of two makes of apparatus, the divinyl ether being placed in the ether reservoir. When given by this method, only a very small amount should be used, since rapid bubbling of the oxygen through the divinyl ether results in too great concentration of the anesthetic in the inspired gas.

The ages of the patients varied from 5 months to 82 years. The anesthetic was so well tolerated by children that we have used it extensively in this group for general surgical and otologic operations. Fifteen of the patients were under 2 years of age and twelve were over 60. The weights of the patients varied from a few

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1. Leake, C. D., and Chen, M. Y.: Proc. Soc. Exper. Biol. & Med. **28**: 151 (Nov.) 1930.
2. Knoefel, P. K.; Guedel, A. E., and Leake, C. D.: Proc. Soc. Exper. Biol. & Med. **29**: 139 (Nov.) 1931.
3. Ruigh, W. L., and Major, R. T.: J. Am. Chem. Soc. **53**: 2062 (July) 1931.
4. Leake, C. D.; Knoefel, P. K., and Guedel, A. E.: J. Pharmacol. & Exper. Therap. **47**: 5 (Jan.) 1933.
5. Gelfan, S., and Bell, I. R.: J. Pharmacol. & Exper. Therap. **47**: 1 (Jan.) 1933.

pounds to 274 pounds (124 Kg.) and the physical make-up was of the variety encountered in any surgical clinic.

The conditions for which anesthesia was induced were extremely varied. It was used for operations for tic douloureux, brain tumor and middle ear disease, thyroidectomy, gastrostomy, gastro-enterostomy, appendicectomy, herniorrhaphy, mastectomy, and operations on the soft parts and bony skeleton. With the single exception of two operations for cholecystectomy, however, the anesthetic was not used for operations on the biliary tract.

It is difficult, as can be attested by those of us who have been anesthetized with this and other anesthetic agents, to describe the effect of divinyl ether in terms of the classic stages of anesthesia. The first stage is, as a rule, extremely short; so short, in fact, that consciousness is often completely lost after a few inhalations. Thus, the picture of analgesia without loss of consciousness, which is seen in the more commonly used inhalation anesthetics, is only rarely observed. The laryngeal reflexes, which are often initiated when diethyl ether is used, are rarely observed with divinyl ether.

Guedel [6] has pointed out that there is a light stage of surgical anesthesia "which affords the surgeon as much ease and comfort in operating as the state of

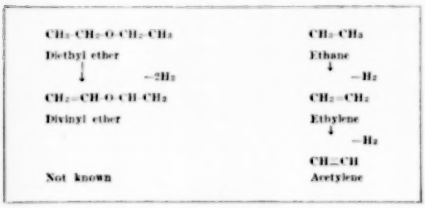

Fig. 1.—Chemical composition of divinyl ether.

deepest third stage anesthesia." This is a period of quietude and tranquillity which affords efficient relaxation and at the same time a maximum of safety to the patient. It is characterized by surgical anesthesia at a time when the eyeballs are oscillating rhythmically. A patient in such a condition is, according to Guedel, in the ideal stage of surgical anesthesia, and we have noted that with divinyl ether it was relatively easy to maintain this stage throughout the operation and at the same time to have efficient relaxation. The continuous movement of the eyeballs at first disturbed us, but subsequent experience proved that it was a state for which to strive rather than at which to be alarmed. It disappears in deep third stage anesthesia.

In only 2 per cent of the patients did we observe real excitement, and this was of very short duration. The rapidity of induction prevents in even the most nervous patient any real or prolonged stage of excitement.

The time from the beginning of the administration of the anesthetic to surgical anesthesia varied, of course, with the type of operation. For relaxation sufficient for a laparotomy, about three and a half minutes was necessary. For extra-abdominal lesions the time was less than this. Several illustrations may be helpful in showing its effectiveness. A man, aged 21, required 14 cc. of divinyl ether for the induction for an appendectomy, the period from beginning the anesthetic to the beginning of the operation being three and a half minutes. The individual variation may be shown in a second patient aged 23, who had good relaxation in two minutes and in whom only 60 cc. of divinyl ether was used over a twenty-five minute period. For minor surgical operations the time for induction varied as a rule from twenty seconds to two minutes.

6. Guedel, A. E.: Pennsylvania M. J. **24**: 375 (March) 1921.

Table 1.—*Concentration of Divinyl and Diethyl Ether in Blood (External Jugular Vein) of the Dog*

Divinyl Ether, Mg. per 100 Cc. Blood			Diethyl Ether, Mg. per 100 Cc. Blood	
Corneal Reflex Absent (20 Tests)		Cessation of Respiration	Corneal Reflex Absent	Cessation of Respiration
18.0	28.7	50.8	92.0	144.0
18.4	29.0	60.0	118.0	147.0
21.6	29.2	61.6	119.0	147.0
21.9	30.0	61.8	120.0	180.0
22.1	30.8	66.0	120.0	
22.6	32.0	68.5	127.0	
23.2	32.6	71.1		
23.8	37.4	77.4		
26.3	37.7	85.5		
28.4	47.0			
Average 28.0		68.0	116.0	134.5

The time of anesthesia varied from ten minutes to two hours and fifty-one minutes. We occasionally observed considerable mucus in patients who had been administered the anesthetic for only a short period, a condition that was considerably more frequent in the dog. This occurred even though atropine sulphate was administered previous to operation. When mucus was present, it disappeared immediately after recovery from the anesthetic.

Even in the patients who had excessive mucus there was no increased tendency to postoperative respiratory complications. The extraordinary absence of respiratory complications, two in 461 anesthetizations, may in part be explained by the care in selection of cases and the unusual care inevitable in the first tests with a new anesthetic. Much as it is to be hoped for, it will scarcely be surprising if this record is not maintained in the future, should divinyl ether come into general use.

The muscular relaxation was good. It was as good as that obtained with diethyl ether and was sufficient for the most extensive laparotomy or for orthopedic manipulations.

The respiration was, as a rule, quiet except when there was a considerable accumulation of mucus. Generally the respiratory rate became slower during the period of surgical anesthesia. In only nine patients was cyanosis observed such as often occurs when nitrous oxide and oxygen are pushed to obtain good surgical relaxation. One of these patients was a child aged 15 months in whom the anesthesia was being used for an ophthalmic operation. The child became cyanotic and cessation of respiration rapidly followed. The pulse remained of excellent quality and after a very short

Table 2.—*Concentration of Divinyl Ether in Blood (Vein Antecubital Fossa) of the Human Being During Surgical Anesthesia*

Mg. per 100 Cc. Blood						
11.3	14.4	15.7	16.8	17.4	21.6	22.7	22.8

Average 18.0

period of artificial respiration the color became good and normal respiration was resumed. This observation was in accord with our experience in the dog, in which it was usually possible to resuscitate the animal rapidly after cessation of respiration.

Records of the blood pressure were kept during 100 operations. In eight patients there was a fall of from 10 to 19 per cent from the preanesthetic level, while in five patients there was a drop of 20 per cent or more. In the remaining patients the fall was less than 10 per cent. The anesthetic was used in patients with a variety of cardiac diseases, including advanced myocardial damage, without any untoward effect.

The amount of divinyl ether necessary for maintenance of anesthesia was, on the average, about 2 cc. per minute. At times it was less than this and occasionally it exceeded this amount. The tendency of the anesthetists was at first to use more than was necessary, basing the rate of the drop on experience with the administration of diethyl ether. It is advisable for anesthetists to begin with minor surgical cases until experience is gained with the anesthetic.

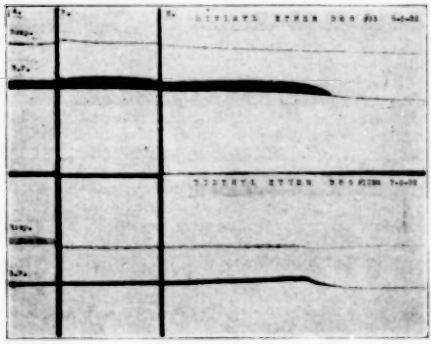

Fig. 2.—Upper strip, divinyl ether: *A*, light anesthesia (blood pressure, 160 systolic, 70 diastolic); *B*, surgical anesthesia (blood pressure 145/60); *C*, terminal stage (blood pressure fifteen seconds before respiratory failure, 135/45). The duration of anesthesia was sixty-five minutes. The persistence of the pulse after respiratory failure was three minutes and fifteen seconds. Lower strip, diethyl ether: *A*, light anesthesia (blood pressure, 170/120); *B*, surgical anesthesia (blood pressure, 160/110); *C*, terminal stage (blood pressure, fifteen seconds before respiratory failure, 190/130). The duration of the anesthesia was forty-two minutes. The persistence of the pulse after respiratory failure was three minutes.

Recovery was unusually rapid. It was often possible, after the anesthetist had had experience with the anesthetic, to have the patient speaking at the time of introduction of the last skin suture. Recovery was, as a rule, smooth and was only rarely accompanied by any excitement, which was very probably due to the rapidity with which the patient's faculties for rationalization returned. The usual period for recovery to the stage of answering questions rationally after operations with a duration of from twenty to forty minutes was from thirty seconds to five minutes. In a patient with a breast carcinoma the duration of the operation was one hour and twenty-two minutes, and the time from complete withdrawal of the anesthetic to recovery was twenty seconds. When preliminary narcotics were used, the period of recovery was sometimes longer. Only in patients with pin-point pupils from the administration of morphine prior to anesthetization did the recovery period exceed five minutes.

Vomiting, including simple eructation of mucus, during the recovery from the anesthetic occurred in 9.5 per cent of the patients. This, as a rule, consisted in the emesis of mucus on one or two occasions. In only one instance did we believe that exaggerated vomiting was related to the anesthetic. A number of patients who had only recently eaten were anesthetized because of surgical emergencies, and the infrequency of vomiting in this group was striking. In patients in whom postoperative oral feeding was not contraindicated, the rapid return of appetite for food was also striking.

The urine was examined repeatedly before and for several days after operation in nearly one half of the cases and in no instance did we obtain any evidence of renal irritation. Even after repeated anesthetization in a patient whose urine previous to operation was normal, no evidences of renal damage or irritation could be found. The anesthetic was used in a number of urologic operations. In patients in whom prolonged or repeated anesthesia might have resulted in liver injury, no evidence of injury could be demonstrated from determinations of the serum bilirubin.[7]

The anesthetic was administered as often as five times to the same patient. It was administered to about thirty-seven patients who previously had had other anesthetics, and in every instance they expressed the opinion that the induction and recovery with divinyl ether was more pleasant than with the anesthetics that had previously been administered to them.

PHYSIOLOGIC STUDIES

In the experiments on both the dog and the monkey no preliminary medication was administered. Third stage anesthesia was more rapidly induced and recovery was more rapid than with diethyl ether. Although considerable accumulation of mucus occurred in the dog, this was not on the whole as great as that observed with diethyl ether. There was, however, a great deal of individual variation in the dogs.

Another example of individual peculiarity was the occasional presence of running motions, usually noted in dogs in which anesthesia was difficult to maintain, although the other signs of complete surgical anesthesia were present. The behavior of the monkey under divinyl ether was more like that of the human being. In the monkey, oscillation of the eyeballs during third stage anesthesia was frequently observed.

In the monkey divinyl ether and chloroform caused no accumulation of mucus, while it frequently followed the administration of diethyl ether. Recovery following three hours of divinyl ether anesthesia took place in from three to six minutes; in fact, the one monkey that was anesthetized for six hours was on its feet and eating a banana within six minutes.

In dogs the concentration of divinyl ether in the blood from the jugular vein at the time of disappear-

7. Since this paper was written the number of patients subjected to divinyl ether anesthesia has exceeded 2,000. Four patients have come to autopsy within five days after operation. In two of these, evidence of a central lobular necrosis of the liver was found. We are briefly reporting these two cases through the kindness of Dr. Dean Lewis of the Johns Hopkins Hospital:

CASE 1.—H. R., a man, aged 54. Diagnosis, carcinoma of the stomach. Operation, partial resection of the stomach, anterior gastroenterostomy and entero-enterostomy. Duration of anesthesia, two hours and forty minutes. Amount of anesthetic used 350 cc. Died in his sleep on the third day after operation. No untoward symptoms between operation and death.

CASE 2.—R. G., a woman, aged 23. Diagnosis, appendicitis? Operation, exploratory laparotomy, appendectomy and exploration of pelvis and upper abdomen. Duration of anesthesia, one hour and thirty-nine minutes. Amount of anesthetic used, 275 cc. Convalescence uneventful for forty-eight hours. She then became drowsy and unresponsive. On the fourth day she became very restless; the pulse rose to 130 and the respirations to 35. On the fifth day she would not respond, the respirations dropped to 12 and the pulse rose to 160 before death.

ance of the corneal reflex averaged 28 mg. per hundred cubic centimeters of blood (table 1), while when diethyl ether was administered under identical conditions the concentration of this substance averaged 116 mg. per hundred cubic centimeters of blood.

These results would indicate that in the dog the anesthetic potency of divinyl ether was approximately four times that of diethyl ether, which figures are somewhat greater than those reported by Knoefel, Guedel and Leake,[2] who estimated the alveolar concentration of the anesthetics.

TABLE 3.—*Effect of Divinyl Ether, Diethyl Ether, and Chloroform on the Liver of Well Fed and of Starved Dogs*

Nutritional State	Anesthetic	Periods of Anesthesia	Number of Dogs	Number with Liver Necrosis
Well fed....	Divinyl ether	1 period of 1 hr.	4	0
		2 periods of 1 hr.	1	0
		3 periods of 1 hr.	3	0
		1 period of 2 hrs.	21	2
		2 periods of 2 hrs.	4	0
		4 periods of 2 hrs.	7	3
		1 period of 3 hrs.	27	8
		2 periods of 3 hrs.	2	0
	Diethyl ether	1 period of 2 hrs.	5	0
		4 periods of 2 hrs.	5	0
		1 period of 3 hrs.	10	0
	Chloroform	1 period of 1 hr.	5	2
		1 period of 2 hrs.	6	5
		1 period of 3 hrs.	2	2
Starved..... (5 days)	Divinyl ether	2 periods of 2 hrs.	2	1
		1 period of 3 hrs.	5	2
	Diethyl ether	2 periods of 2 hrs.	2	0
		1 period of 3 hrs.	6	0
	Chloroform	2 periods of 2 hrs.	1	1
		1 period of 2 hrs.	4	4
Biliary obstruction. (17-22 days)	Divinyl ether	1 period of 1 hr.	5	0

In the basis of these data it would appear that the actual difference in milligrams per hundred cubic centimeters of the blood concentration between the anesthetic and the lethal dose of divinyl and diethyl ether is approximately the same. It should be admitted, however, that in inexperienced hands it would be easier to pass from the anesthetic to the lethal concentration of divinyl ether. The use of margin of safety ratios in this connection would be, we believe, somewhat misleading. In the hands of the careful anesthetist, divinyl ether has a satisfactory margin of safety.

In the human patients (table 2) the results showed an average concentration of divinyl ether in peripheral venous blood, in third stage anesthesia of 18 mg. per hundred cubic centimeters of blood (nine determinations), as against 132 mg. in a single determination under diethyl ether.

We observed no significant differences in the effects of divinyl and diethyl ether on the blood pressure and respiration of the dog (fig. 2). In neither were any sharp variations in blood pressure noted as long as good surgical anesthesia was maintained. The fall in the blood pressure from the level present during light anesthesia to the level existing during surgical anesthesia was approximately the same for both diethyl and divinyl ether. In human cases in which precipitate falls in the blood pressure occurred, the fall could in every instance be ascribed to some other factor associated with the operation.

As from diethyl ether, death from divinyl ether is due to respiratory failure, the heart continuing to contract for some time after cessation of respiration (fig. 2). Since recovery from divinyl ether anesthesia is rapid, artificial respiration usually will rapidly restore an animal whose respiration has ceased.

PATHOLOGIC STUDIES

The effect of divinyl ether on various tissues was studied in seventy-nine dogs and nineteen monkeys (Macacus rhesus) under several experimental conditions. Forty-six dogs and ten monkeys were studied under similar conditions after the administration of diethyl ether or chloroform. In this work we had the assistance of Drs. Wallis, Quereau and Wiig.

The conditions under which the experiments were performed with the three anesthetics were varied as to the duration of the anesthesia, the number of anesthetizations, the nutritional state of the animal and, with divinyl ether alone, after complete obstruction of the extrahepatic bile ducts.

Specimens of the different organs were taken, as a rule, on the third day following anesthetization, since it was found that when tissue change occurred it could be best demonstrated at that time. The only significant change was found in the liver, so that our report is confined to this organ. Biopsies of the liver were performed under each of the experimental conditions prior to beginning the experiment to serve as controls.

Divinyl ether may induce liver necrosis in the dog. When liver damage followed divinyl ether anesthesia, the histologic picture was that of a central lobular necrosis. To this extent it resembled the liver necrosis of chloroform anesthesia. However, under identical experimental conditions the liver change that followed divinyl ether anesthesia was in general less marked than after chloroform. In contrast to the dog, liver damage did not occur in the monkey following divinyl ether anesthesia under any of the experimental conditions that were used. In neither animal did diethyl ether produce liver necrosis.

TABLE 4.—*Effect of Divinyl Ether, Diethyl Ether, and Chloroform on the Liver of Well Fed and of Starved Monkeys*

Nutritional State	Anesthetic	Periods of Anesthesia	Number of Monkeys	Number with Liver Necrosis
Well fed.....	Divinyl ether	1 period of 2 hrs.	3	0
		2 periods of 3 hrs.	13	0
		1 period of 6 hrs.	1	0
	Diethyl ether	1 period of 3 hrs.	1	0
	Chloroform	1 period of 3 hrs.	3	0
Starved..... (2 days)	Divinyl ether	1 period of 3 hrs.	2	0
	Diethyl ether	1 period of 3 hrs.	4	0
	Chloroform	1 period of 3 hrs.	2	2

The results of the experiments on dogs are summarized in table 3. In a group of sixty-nine well fed normal dogs anesthetized for various periods with divinyl ether, thirteen were found to have developed liver necrosis. Necrosis was not found after one hour of anesthesia. It occurred, however, in two (10 per cent) of twenty-one animals anesthetized for one two-hour period, and in eight (30 per cent) of twenty-seven

dogs anesthetized for one three-hour period. The remaining three instances of liver necrosis followed four two-hour periods of anesthesia in seven dogs. The interval between anesthetizations for the latter group was four days.

The duration of the divinyl ether anesthesia was thus found to be a definite factor in the production of liver

Fig. 3.—Necrosis in the liver of the dog induced by chloroform. The inner two thirds of the several lobules shown are necrotic. The cells bordering the necrotic areas contain large fat droplets. Reduced from a photomicrograph with a magnification of 75 diameters.

necrosis in the dog. The critical period in this animal was found to lie between two and three hours.

In the control groups following comparable periods of anesthesia, chloroform anesthesia resulted in liver necrosis in two of five dogs after one hour of anesthesia, and in five of six dogs which received it for two hours and in both of the dogs receiving three hours of chloroform (fig. 3). Diethyl ether did not cause necrosis.

Of the five dogs deprived of food for three days prior and two days subsequent to a three-hour period of divinyl ether anesthesia, two developed liver necrosis (fig. 4). When under similar nutritional conditions divinyl ether was administered to two dogs for two hours on both the third and the fourth day, liver necrosis was found in one animal. In dogs, necrosis following chloroform invariably occurred under these conditions, while it was never observed following diethyl ether anesthesia.

The necrosis that followed divinyl ether anesthesia in dogs whose food had been withheld was decidedly more extensive than that found in the dogs which were well fed. The importance of the nutritional state in the occurrence and severity of the liver necrosis is well illustrated in the dogs that were anesthetized for two two-hour periods. In the well fed animals liver necrosis was not observed in the four dogs so treated, while, in the two that were starved, liver necrosis was found in one instance.

Two weeks after ligation of the extrahepatic bile ducts and cholecystectomy, three dogs were anesthetized with divinyl ether for one hour, during which time we performed a biopsy of the liver. The histologic picture was not found to be significantly altered three days later. Thus, in the group in which liver necrosis was most feared, none was found.

Of the well fed monkeys given divinyl ether, three were anesthetized for one three-hour period, thirteen for two three-hour periods on alternate days, and one for six hours continuously. None of these showed necrosis of the liver. It is noteworthy that, of three monkeys anesthetized for three hours with chloroform, not one gave any evidence of liver damage (table 4).

When deprived of food for two days prior to anesthetization, two monkeys, following one three-hour period of divinyl ether anesthesia, failed again to show liver necrosis. But two monkeys similarly deprived of food and anesthetized with chloroform for three hours developed liver necrosis, demonstrating that typical necrosis may occur in the liver of the monkey. Diethyl ether anesthesia failed to produce liver necrosis under either of these conditions.

These experiments demonstrate the importance of the nutritional state and the species difference in considering the toxicity of an anesthetic. It may be said that, in respect to its toxicity for the liver in dogs, divinyl ether holds a position intermediate between chloroform and diethyl ether. In monkeys it resembles diethyl ether in this respect.

SUMMARY

We may thus far sum up our experience with divinyl ether by stating that from the standpoint of induction, maintenance and recovery the anesthetic is satisfactory. It affords rapid surgical anesthesia with

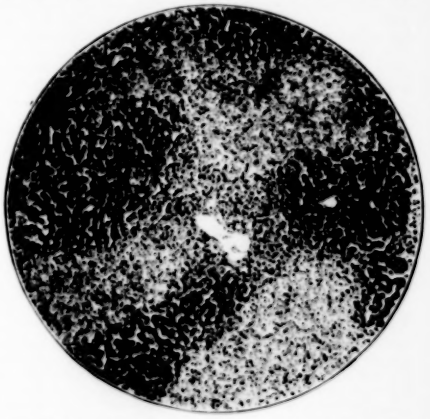

Fig. 4.—Necrosis in the liver of the fasting dog induced by divinyl ether. This kind of necrosis is very similar to that shown in figure 3. Reduced from a photomicrograph with a magnification of 75 diameters.

a minimum amount of the anesthetic, even maintenance, good relaxation and rapid recovery. No untoward effects have been observed on the blood pressure or respiration. The very low incidence of excitement or postanesthetic vomiting and of respiratory complications in our series is noteworthy.

The anesthetic concentration in the blood necessary for surgical anesthesia in dog or man is low, and the

lethal concentration in the dog is nearly two and one-half times the anesthetic concentration. The absolute difference between the anesthetic and the lethal concentrations in the dog for divinyl and diethyl ether is about the same. The anesthetic should be, however, carefully administered, since the lethal concentration of divinyl ether in the dog is only about one-half the anesthetic concentration of diethyl ether. The circulation is well maintained for a time after cessation of respiration.

In the human being we have encountered no untoward effects on the liver or kidneys, but we have been careful to avoid its use in patients who were being operated on for disease of the biliary tract. The fact that in the dog it produces, under certain conditions, liver necrosis is not reason for undue alarm. Chloroform, which causes liver degeneration more easily and more extensively in the dog, is more feared for its effect on the heart than on the liver. Furthermore, divinyl ether failed to produce liver necrosis in the monkey under any of the conditions imposed on it.

The anesthetic should be very useful in operations in which rapid induction and recovery with a minimum of after-effects are desirable. Its exact position in relation to the other general anesthetics now being used will have to await a more extensive clinical experience.

ABSTRACT OF DISCUSSION

DR. RALPH M. WATERS, Madison, Wis.: To have a new drug introduced with a study of some 500 cases before a clinical report is made of it is a rare thing in therapeutics in general. The authors have compared the drug to ether as to induction and recovery. It seems to me that that is not a very interesting thing about a new drug unless it can be compared with nitrous oxide as to induction and recovery, because I feel that nitrous oxide should be the criterion of present agents for induction and recovery. The authors have admitted liver necrosis in dogs. They have not found it in human beings. Liver necrosis has been one of the fears about the old agents and makes one worry a bit perhaps. Let me use what little time I have to tell about my experiences. My associates and I had a supply of the drug furnished us by Dr. Major of the Merck Laboratories late in 1931 and we observed it early in 1932. We found not only these running movements at that time that the authors have mentioned but much more severe muscular activity, which could almost be looked on as convulsive in type. We felt that the drug with which we were working must be a different drug from that with which Drs. Leake, Knoefel and Guedel had worked and, therefore, dropped it. This spring, since the authors were to present a paper here, I was asked to observe the drug, which they are using now. The drug was checked by sending some of the lot which was sent to me back to Dr. Ravdin for verification of its identity. We find similar results with this drug to the ones that we had in 1932. That is, in a certain percentage of dogs with which we have worked, we have seen muscular phenomena that were not satisfactory as an accompaniment of anesthesia. In certain cases apparently we could not eliminate these muscular activities even by pushing the drug. Several dogs in the early part of the induction ran into some sort of circulatory disturbance which I find hard to describe but which came on suddenly early in the induction, resulting in the death of the dogs, with the cessation of the heart action almost synchronous with the cessation of respiration. Dr. Meek has observed with the electrocardiograph some of these experiences and I hope that he may be able to give his opinion about the effect on the circulatory system, which I am not capable of discussing. From what little I have seen of the drug, either I have mishandled it very severely or else the drug has some qualities that I think would not be well to introduce at this time into anesthesia for ordinary practical purposes.

DR. HENRY S. RUTH, Philadelphia: This anesthetic was sent to me by the manufacturers about two months ago at the suggestion of Dr. Ravdin. Not having at hand the immediate facilities for animal experimentation in the laboratory, I accepted the complete report of Dr. Ravdin and his associates on his work at the University of Pennsylvania. To date I have attempted its use only in a series of ten patients. I have noticed a comparatively quiet induction with little excitement as compared to ethyl ether. Production of mucus was present in each case but not to the extent to provide annoyance. In every case there was produced an obstruction to respiration which persisted for varying lengths of time. This obstruction was interpreted as a laryngeal spasm because it was not relieved by the induction of artificial airways, nor was the type of phonation that which is caused by obstruction elsewhere in the respiratory passages. I also observed, as the authors mentioned, a wide range in the dosage required. This varied from 75 cc. for fourteen minutes of anesthesia in one patient to the other extreme of 75 cc. producing satisfactory anesthesia for forty-five minutes in another patient. By the ordinary clinical methods of observation of cardiac action, I could observe no deviation from the normal; no electrocardiograms were taken. There was a negligible variation in blood pressure. One experience I was unable to interpret: A woman, aged 25, an excellent physical risk, was a subject for a simple bilateral salpingo-oophorectomy. After an induction of three minutes' duration, I interpreted the anesthetic plane to be the middle stratum of the surgical stage. The corneal reflex had disappeared a very short time before, which coincided with previous observations that the corneal reflex with this agent disappears early. Oscillation of the eyeball was still present. The color of the patient was normal, with no clinical signs of anoxemia. The circulatory status of the patient was excellent, when suddenly there appeared a state of severe generalized convulsions during which, of course, there was practically no tidal respiration whatever. After about a minute and a half from the onset of these convulsions her color began to grow dusky and then cyanotic in rapidly increasing degrees. The lungs were then gently inflated with 100 per cent oxygen, which rapidly restored her color and in another moment or two the convulsions subsided. Ethyl ether was immediately substituted as the anesthetic agent and the operation was begun and brought to a successful conclusion devoid of any further complications.

DR. WALTER MEEK, Madison, Wis.: I hesitate to say anything that will detract from a paper so well worked up as that of the authors, which has back of it so much experience. My study was with some of Dr. Waters' animals, particularly in regard to the heart. In one case I found a heart block appearing certainly before the animal was at a surgical stage of anesthesia. In a second animal there was no heart block, but there was considerable widening of the QRS complex and a split R. That would mean ordinarily that there had been some myocardial damage. A third dog showed the disappearance of heart beats simultaneously with cessation of respiration. The number of animal experiments is somewhat limited. There are only six or seven animals on which I have the straight cardiac study throughout. I may mention another case in which, after the anesthesia, a stormy period was finally passed through and the heart then remained normal for a long time. The electrocardiographic results do not seem to be due to the showers of extrasystoles seen in chloroform anesthesia but an entirely different phenomenon, an effect either directly on the heart muscle or, of course, possibly through the vagus. It is not entirely clear which mechanism is involved. It might be said that the anesthetic had merely been crowded to the toxic stages. At least three of these animals, however, had not passed out of those curious running movements which were found so common in the dog before heart disturbances appeared. It must be realized, of course, that dogs are dogs and people are people, and this new anesthetic might not be very safe for the heart of the dog and still have no objectionable properties for man. I recognize this contingency, although I feel the danger of general cardiac involvements at the present time.

DR. CHAUNCEY D. LEAKE, San Francisco: It is gratifying to know from the studies reported by the authors that the predictions made for divinyl oxide have some reality in fact. I

think the discussion and the presentation of this paper are interesting from the standpoint of oxygen want. The majority of the experiments were performed with the drop method. I think the observations made by Dr. Waters and Dr. Meek on dogs were also made under the drop method. In this method it is necessary during the period of induction to use a much higher concentration of the anesthetic agent than is needed actually for anesthesia. That high concentration throws out the oxygen. I think that many of the experiences that have been described are due more to anoxemia than to a toxic factor in divinyl oxide, if the divinyl oxide used was pure. In my own experimental studies in this agent, which were very extensive, I was early led to adopt a method of administration that precluded the possibility of anoxemia. Under those circumstances I found no untoward effects whatever as long as the material was pure. Divinyl oxide is manufactured from a chlorinated ether. Although it is stated that it is free from the presence of chlorinated ether, I think some samples, nevertheless, may still retain traces of this agent. The chlorinated ethers are not at all anesthetic; they are very toxic, I have found. It may be that the cardiac and liver effects described are due to traces of chlorinated ethers in the presence of anoxemia. I should like to ask the authors whether they noted clinically a degree of abdominal relaxation before intercostal paralysis occurred. This was a factor that I considered, from the experimental standpoint, as being favorable for human anesthesia. I found in my own studies no liver, kidney, cardiac, lung or any other significant pathologic injury whatever on repeated administrations at half hour intervals daily for as many as thirty days in dogs, provided there was no anoxemia. The extensive mucous secretion to which reference was made is due, I think, to local irritation, which may again be caused by the possible presence of minute traces of impurities in the compound. Such impurities, Dr. Major informed me, may be formaldehyde or formic acid, which are extremely irritative in very small concentrations not detectable chemically. Any trace of any impurity, therefore, in the compound might be expected to induce deleterious effects, particularly if the agent is administered with anoxemia. It is my opinion that material that is to be used for human beings should be, as the authors have said, first tried on experimental animals.

DR. RALPH M. WATERS, Madison, Wis.: I should like to correct a misunderstanding on Dr. Leake's part: Several of these animals under the electrocardiograph were anesthetized with pure oxygen as the vehicle.

DR. HIRAM E. ESSEX, Rochester, Minn.: My observations of this anesthetic have been very limited. My experiments have been on rabbits and dogs. With rabbits, I have found that induction and recovery are very rapid, but my experience has not been the same with the dog. Some dogs seem to go under easily and some do so with a great deal of difficulty. My experience with one dog would answer the description that Dr. Ruth gave of one of his patients. On another I used three bottles, 75 cc. in each bottle, and the dog was still struggling, and it was necessary to switch to diethyl ether in order to get the animal anesthetized. Regarding recovery, my experience has been variable. Some dogs seem to come out quite rapidly and others take longer. I took dogs that were to be operated on, and put some under the divinyl ether and some under ethyl ether. The recovery period went from five to twenty-five minutes with the divinyl ether and many times it was not longer with the ethyl ether. There is one thing I noted as I gave the anesthetic by the open drop method and that was the irritating effect on the eyes of some of the assistants. One individual seemed particularly sensitive to this drug.

DR. JOHN S. LUNDY, Rochester, Minn.: I have used this agent only in operations for radical amputation of the breast, so that operative conditions might be as nearly similar as possible in each case. I have tried it with morphine and without, and with and without a barbiturate. I observed unilateral dilatation of the pupil of two patients, which may have no relation at all to the drug. I observed a certain amount of rigidity of the jaw, a certain stertor that I was unable to avoid except in one case, in which I finally got the jaw well forward and then the airway apparently was free. I have not yet discovered the proper method of administration of this particular agent, unless it is that I have not provided a clear airway. The consignment sent to the clinic was tested by Dr. Osterberg and found to be pure according to the tests for purity. In both rabbits and man anesthetized with this drug, the same type of dyspnea was noted.

DR. I. S. RAVDIN, Philadelphia: The discussion has unfortunately been limited to those who have had a very short experience with divinyl ether. My associates and I will be very happy if a year from now, when the various workers have had a wider experience with this substance, they will again report their results. In regard to liver necrosis, which Dr. Waters mentioned, it should be recalled that the anesthetic was used in dogs in which two weeks previously an obstruction of the common bile duct had been produced. This is the type of lesion that, in man at least, would make one most fearful of extensive liver necrosis with an anesthetic that may produce injury to the liver. In none of the animals so treated did liver necrosis occur. Dr. Leake has brought out the factor of anoxemia and it is probable that certain of the running motions which we observed were associated with anoxemia. We do not believe that the liver necrosis was due to this. The circulatory phenomena which Dr. Waters and Dr. Meek described we have not experienced, although we have made no electrocardiographic studies. In the dog and in the monkey, repeated sections were made of the heart muscle and there was no evidence of myocardial change in animals that had been subjected to long periods of anesthesia. It has been our feeling that there was no laryngospasm connected with this anesthetic. We have repeatedly introduced a bronchoscope during anesthetization with divinyl ether and had no difficulty getting through into the trachea of these animals. We observed no convulsions during divinyl ether anesthesia but I know that convulsions may occur even during diethyl ether anesthesia. The degree of abdominal relaxation in man is good—as good as that seen with diethyl ether. It would be interesting if Dr. Lundy and Dr. Essex would induce the anesthesia in Dr. Mann's anesthesia chamber by the method he uses for the induction of diethyl ether anesthesia. The experiences that we have had with this anesthetic in nearly 600 anesthetizations were, on the whole, very satisfactory. We at times observed the peculiar freezing of the jaw, as stated in the paper, and also in man we had at times considerable mucus and some stridor. It has been our feeling that the latter was associated with a falling backward of the tongue rather than with laryngospasm, because when a soft rubber airway was provided the difficulty immediately disappeared. If this is due to laryngospasm, it should not disappear. We presented this report because it seemed to us that this anesthetic agent might be useful in surgical practice. We wish to stress that final decision will have to await a much more extensive clinical experience.

The Use of the Senses.—The lemon tint of pernicious anemia, not always readily distinguished from the more sallow tint of gastric malignancy, a disease which it may simulate in many other ways, is none the less characteristic. In gastric cancer it is more likely that there will be evidence of loss of weight, with the so-called cachectic appearance, and a slightly bluish nose is a frequent feature. The brick-red facies of polycythemia, sometimes simulating rude health at a first glance, but often with a tinge of blueness or purple to modify opinion, is quickly confirmed by turning down the deep-red eyelid just as we do in looking for the conjunctival pallor of anemia. The watery eye, the blotchy face, and the reddish venous nose of alcoholism, sometimes with tremulous lips and tongue, may give the clue to a correct interpretation of digestive or nervous symptoms. Acne rosacea may likewise prompt a diagnostic of gastritis. The slightly drooping lids and wrinkled forehead of tabes, and the parkinsonian mask of paralysis agitans or past encephalitis, with its flat, unwinking, sad, uncomfortable lack of expression (quite different from the puffy impassivity of myxedema), are strongly diagnostic. The dark greenish brown of chronic obstructive jaundice, and the dirty muddy-brown pallor of uremia, whether due to chronic interstitial nephritis in a young man or to prostatic obstruction in an old, are other examples of diagnostic color change.—Ryle, J. A.: The Training and Use of the Senses in Clinical Work, *Guy's Hosp. Gaz.* **47**:421 (Oct. 28) 1933.

INFILTRATION VERSUS SPINAL ANESTHESIA IN OBSTETRICS AND GYNECOLOGY

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Obstetricians and gynecologists have only recently begun to use local anesthesia to any great extent. However, surgeons long ago recognized that it was advisable to avoid the use of inhalation anesthetics when operating on individuals with serious medical complications such as respiratory infections, heart trouble, kidney disease, high blood pressure and diabetes. Therefore, local anesthesia in some form was used for these cases. Later it became apparent that if local anesthesia was less hazardous for seriously ill patients it was also safer for individuals whose general physical condition was good.

DISADVANTAGES OF GENERAL ANESTHESIA

Briefly, the disadvantages of inhalation anesthesia are as follows:

1. No general anesthetic is perfectly safe. Therefore there is a definite though slight mortality. In a study of 148 deaths following gynecologic operations, Bartlett and Simmons [1] found that eighteen, or 12.3 per cent, occurred on the operating table as a result of the ether. Of the eighteen patients who died only four were poor risks, but the rest were satisfactory subjects for a general anesthetic. The incidence of deaths from ether in 10,325 abdominal operations was 0.15 per cent, or one death in 738 cases. Thornton [2] maintains that there is an increased incidence of deaths under anesthetics. He found the mortality rate to be 0.19 per cent for all general anesthetics. Kaye [3] reported a series of 107 deaths which occurred during anesthesia, of which ninety-nine occurred under general and eight under local anesthesia. Of course, far more patients are operated on under general than under local anesthesia, but Rollison [4] encountered six deaths during 6,062 general and no deaths in a series of 1,981 local anesthesias.

2. There is a distinct risk of pneumonia and other pulmonary complications.

3. Acidosis and alkalosis may result from prolonged anesthesia.

4. Shock may follow a long anesthesia.

5. Dehydration is common after prolonged anesthesia.

6. There is lowered resistance of the peritoneum to infection.

7. There is a toxic effect on the liver and other vital organs which makes inhalation anesthesia especially bad for women who have toxemias of pregnancy, cardiorenal disease, diabetes, goiter, hypertension and pulmonary disorders.

8. There are frequent gastro-intestinal disturbances after operation, especially vomiting, distention and "gas pains."

9. Under general anesthesia there is a tendency to mishandle tissues, and this may lead to complications such as thrombosis and embolism.

Read before the Section on Obstetrics, Gynecology and Abdominal Surgery at the Eighty-Fourth Annual Session of the American Medical Association, Milwaukee, June 14, 1933.

1. Bartlett, M. K., and Simmons, F. A., Jr.: Surg., Gynec. & Obst. **55**: 777 (Dec.) 1932.
2. Thornton, Edward, cited in Cape Town letter, J. A. M. A. **100**: 204 (Jan. 21) 1933.
3. Kaye, Geoffrey: M. J. Australia **2**: 579 (Oct. 19) 1929.
4. Rollison, J. W.: M. J. Australia **2**: 580 (Oct. 19) 1929.

DISADVANTAGES OF SPINAL ANESTHESIA

Most surgeons who employ local anesthesia use some form of spinal injection. This method has the following disadvantages:

1. There is a definite mortality. Cooke [5] says that spinal anesthesia "is apparently as judged by mortality statistics more dangerous than general anesthesia on the whole." Bower, Clark and Burns [6] make the following statements: "Spinal anesthesia is responsible for more deaths than any other anesthetic in proportion to the number administered. . . . Undoubtedly many deaths have occurred from the (spinal) anesthetic that have been attributed to other causes. . . . Up to the present time there is no known method of absolutely preventing deaths from spinal anesthesia, but artificial respiration offers the best means of combating respiratory embarrassment and fall in arterial pressure." M. E. Babcock [7] collected 215,000 cases of spinal anesthesia and in this series there were seventy-five deaths, or one in 2,867 cases. Through questionnaires, he received information that forty-six hospitals had had ninety-one deaths on the table and eleven after operation, all attributable to spinal anesthesia. Eighteen of these hospitals listed 15,652 spinal anesthetics with forty deaths on the table (one in 400 spinal anesthesias). Rapoport [8] reports a series of 500 spinal anesthesias with nineteen pneumonias and seven deaths. Sise [9] collected reports of fourteen deaths which occurred under 1,900 spinal anesthesias in Greater Boston during 1928. Bortone [10] in eighty-five New Jersey hospitals found one death for every 1,628 general and one fatality for every 311 spinal anesthesias.

Generally, the deaths due to spinal anesthesia occur shortly after the injection of the anesthetic. The fatalities are usually attributed to respiratory paralysis, to the position in which the patient is placed after the injection, to a fall in blood pressure or to circulatory changes. However, deaths may occur many days after the injection and still be due to this form of anesthesia, as may be proved by a study of the central nervous system.

2. The incidence of pulmonary complications is at least just as high as after inhalation anesthesia. In fact, Brown and Debenham [11] found that pulmonary complications, especially atelectasis, occurred 4.29 times more commonly after spinal (subarachnoid) anesthesia than after inhalation anesthesia, in spite of the fact that more "bad risk" patients were operated on under general anesthesia. The reasons for this are as follows: First, spinal anesthesia definitely inhibits the depth and force of respiratory movements, not only during the operation itself but also for some time afterward. It is these respiratory movements that tend to rid the tracheobronchial tree of foreign matter or secretions. Second, the normal viscosity of the secretions of the tracheobronchial tree appears to be increased; hence it is more tenacious after spinal anesthesia. Third, the patient tends to remain quiet for a few hours after an operation performed under spinal anesthesia; hence there is a greater possibility for the material in the tracheobronchial tree to obstruct a bronchus with the subsequent development of atelectasis. Arnheim and

5. Cooke, W. R.: M. Rec. & Ann. **23**: 435 (June) 1929.
6. Bower, John; Clark, J. H., and Burns, J. C.: Spinal Anesthesia, J. A. M. A. **100**: 245 (Jan. 28) 1933.
7. Babcock, M. E.: Anesth. & Analg. **11**: 184 (July-Aug.) 1932.
8. Rapoport, B. D.: New England J. Med. **198**: 447 (April 19) 1928.
9. Sise, L. F., quoted by Bevan.[35]
10. Bortone, F.: Anesth. & Analg. **11**: 256 (Nov.-Dec.) 1932.
11. Brown, A. L., and Debenham, N. W.: Postoperative Pulmonary Complications, J. A. M. A. **99**: 209 (July 16) 1932.

Mage [12] report that postoperative pneumonia occurred in 8 per cent of their 120 cases in which nupercaine spinal anesthesia was used. In the 338 cases reported by McKittrick, McClure and Sweet [13] there were eighteen cases of postoperative pneumonia, but since there were sixteen additional complications of the respiratory system the incidence of these complications was 10 per cent. They accounted for 40 per cent of all the complications in this series. The mortality rate in the group of postoperative pneumonias was 46 per cent. Since the incidence of pulmonary complications is at least as high as if not higher than after general anesthesia, spinal anesthesia should not be chosen in the hope of preventing these complications.

3. There is a definite toxic effect on the spinal cord and the spinal nerve roots which is manifested both clinically and pathologically.[14] Davis, Haven, Givens and Emmett [15] injected the most commonly used spinal anesthetics into the dural sacs of dogs and observed the following changes: a varying degree of inflammatory reaction in the leptomeninges; changes in the ganglion cells of the gray matter of the cord; swelling and fragmentation of the axis cylinders, and signs of degenerative changes in the fiber tracts of the cord. Myelitis and meningitis may result from an infection carried in with the needle or solution, but they may also occur in the presence of a generalized infection that tends to localize at the site of the lumbar puncture. There may be early and temporary effects such as headaches and mild paralysis of the oculomotor and abducens nerve. The late effects, which may appear months and years afterward, are paralysis of the sphincter ani and incontinence, spastic paralysis and paraplegia.

4. There is frequently a pronounced fall in blood pressure, which may be accompanied by vomiting, restlessness, pallor, cold sweat, weak pulse, shallow respirations and sometimes unconsciousness. In 10.8 per cent of the series reported by McKittrick, McClure and Sweet,[13] the fall in systolic blood pressure during the operation was 50 per cent or more of the preoperative level. In 25 per cent of these cases the blood pressure did not return to the preoperative level for at least twenty hours after the patients returned to their wards.

5. Nausea and vomiting occur in many cases during the course of the operation, and this may prove troublesome.

6. Headaches both temporary and persistent frequently occur after operation.

7. The uterus may fail to relax when this becomes necessary. In more than half the cases spinal anesthesia retards labor, necessitating operative intervention. This is most likely due to abolition of the sensory phase of the sensory-motor reflex, which normally brings the voluntary muscles into action.

8. Pregnant women are especially susceptible to complications after spinal anesthesia. This is the opinion of such authorities as Winter,[16] Konrad,[17] Pankow,[18] Heim,[18] Babcock[19] and others. De Lee[20] knows of seventeen deaths in obstetrics from spinal anesthesia. Brindeau[21] encountered two deaths due to spinal anesthesia in 102 cesarean sections, and Lull[22] says: "Of the fourteen cases (of cesarean section) done under spinal anesthesia two patients died before the operation was started." M. E. Babcock[7] also reports four deaths while women were undergoing abdominal delivery. Aside from the increased risk, it is technically difficult to administer spinal anesthesia to a woman at or near full term because of the impossibility of properly flexing the trunk.

9. After the drug has been injected into the spinal canal it is beyond control, and, if alarming symptoms appear, the cause cannot be removed.

10. Special knowledge is required both for the injection of the drug and for the recognition and treatment of complications.

11. The method fails in at least 5 to 10 per cent of all cases. In Arnheim and Mage's [23] series, supplementary inhalation anesthesia had to be employed in 32.8 per cent of the cases. Deaver and Eckels [24] report that in their series of 2,302 cases additional anesthesia was required in as high as 32.3 per cent. In nearly all cases in which supplementary anesthesia is necessary, a general anesthetic is chosen. As McKittrick, McClure and Sweet [13] emphasize, serious harm may result if proper care is not exercised in the administration of a general anesthetic when the field of operation is already anesthetized.

12. In some instances the danger of spinal anesthesia is greater than that of the operation itself.

13. Spinal anesthesia is hazardous in women with anemia and cardiac decompensation.

14. It cannot be used in cases of shock due to intra-abdominal hemorrhage, abruptio placentae or other causes.

15. Only a small proportion of physicians would be willing to submit to spinal anesthesia. As Bevan [25] points out, "the application, therefore, of the Golden Rule should limit spinal anesthesia to a narrow field."

16. Not only is the technic of spinal anesthesia not standardized but also there is no unity of opinion concerning the proper drug to be used. There are advocates of procaine hydrochloride, novocain (a brand of procaine hydrochloride), spinocaine (a non-Council accepted brand of procaine hydrochloride with strychnine sulphate), neocaine (a French brand of procaine hydrochloride), tutocain, nupercaine, stovaine (amylocaine hydrochloride B. P.), pantocain, apothesine and other substances, and this array indicates that no one drug is entirely satisfactory.

DISADVANTAGES OF INFILTRATION ANESTHESIA

1. Infiltration anesthesia cannot be used if the site at which the solution must be injected is infected or inflamed.

2. If it is known or suspected that many peritoneal adhesions will be encountered, infiltration anesthesia should not be attempted. Nevertheless in many cases this type of anesthesia may be used for most of the operation, aided by a short general anesthetic when the adhesions are being dealt with.

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13. McKittrick, L. S.; McClure, W. L., and Sweet, R. H.: Surg., Gynec. & Obst. **52**: 898 (April) 1931.
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15. Davis, Loyal; Havens, Hale; Givens, J. H., and Emmett, John: Effects of Spinal Anesthesia on the Spinal Cord and Its Membranes, J. A. M. A. **97**: 1781 (Dec. 12) 1931.
16. Cited by Heim.[18]
17. von Konrad, E.: Zentralbl. f. Gynak. **52**: 2111 (Aug. 18) 1928.
18. Heim, K.: Monatschr. f. Geburtsh. u. Gynak. **84**: 45 (Jan.) 1930.
19. Babcock, W. W., quoted by Eades, M. F.: Am. J. Obst. & Gynec. **23**: 407 (March) 1932.
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21. Brindeau: Bull. Acad. de méd., Paris **95**: 194 (March 2) 1926. Brindeau, Gagey and Schwaab: Bull. Soc. d'obst. et de gynec. **18**: 31 (Jan.) 1929.
22. Lull, C. B.: Am. J. Obst. & Gynec. **25**: 426 (March) 1933.
23. Arnheim, E. E., and Mage, Sigmund: Ann. Surg., Gynec. & Obst. **93**: 929 (April) 1931.
24. Deaver, J. B., and Eckels, J. C.: New England J. Med. **203**: 760 (Oct. 16) 1930.
25. Bevan, A. D.: The Present Status of the Anesthesia Problem, J. A. M. A. **97**: 1530 (Nov. 21) 1931.

3. This form of anesthesia should not be attempted in a woman who is exceedingly high strung and has an almost morbid fear when she is told that her operation will be performed under local anesthesia. Fortunately there are only a few women of this type. Their number can still further be reduced by properly preparing patients for this form of anesthesia. After all, local anesthesia is a relatively new procedure, and patients believe that they will see their operation performed, that they will hear all that goes on in the operating room and that they will experience much pain. A proper preparatory talk on the part of the operator is essential. The patient should be promised that her eyes will be covered so she will not see anything around her, that the conversation she will hear will not be gruesome or disagreeable, that the rattle of instruments and pans will be reduced to a minimum and above all that, if she feels much pain and so desires it, a general anesthetic will be administered to her. The operator should live up to his promises all the way through the operation or the patient may lose confidence, become hysterical and demand a general anesthetic. The chain of local anesthesia consists of the operator, his assistants (including physicians and nurses), the patient and the local anesthetic. The most important link in the chain is the operator himself. He must first of all convince himself that local anesthesia is the safest and simplest of all anesthetics; he must learn the simple technic and, above all, must be willing to sacrifice the extra time and physical and mental effort that operations performed under local anesthesia demand.

ADVANTAGES OF DIRECT INFILTRATION ANESTHESIA

1. There is practically no mortality due to this method. The number of fatalities reported in the literature as having occurred after infiltration anesthesia is extremely small and in most instances the drug responsible for these deaths was cocaine. As far as I know, this drug is never used for obstetric or gynecologic operations at the present time.

2. There are no pulmonary complications directly attributable to this procedure. It is of special importance in the delivery of women who have pulmonary disorders such as tuberculosis, bronchitis, asthma and influenza. It is also an advantage in the delivery of women who have eclampsia and preeclampsia, because these patients are particularly susceptible to pneumonia. This type of anesthesia is most helpful during the seasons of the year when grip and pneumonia are prevalent. One of the chief reasons for the absence of pulmonary complications is the fact that the lungs are well aerated not only during delivery or operation but also afterward. Frey [26] reports a series of 281 cesarean sections performed under direct infiltration anesthesia without the occurrence of pneumonia in a single instance, whereas in the seventy-two cases in his series in which general anesthesia was used, five patients developed pneumonia. I have performed 111 cervical cesarean sections under direct infiltration anesthesia without the occurrence of postoperative pneumonia or a fatality. However, two women in my series of cesarean sections developed pneumonia after ether anesthesia and both recovered.

3. There are no local or general complications. There are only three possible sources of trouble and fortunately I have never seen any. A needle may break during an injection, especially if an old or rusty needle is used. To prevent this, only good needles should be employed. Furthermore, since a needle practically always breaks near the hub, the needle should never be inserted its full length so that, should it break off, it can readily be extracted. The second possible source of trouble is the injection of the solution directly into a vein. This might cause disturbing symptoms, which, fortunately, last only a short time. To avoid this, one should, before injecting the solution into any area, always pull up on the plunger of the syringe to see whether any blood is drawn into the barrel of the syringe. If blood is seen, a new area must be selected for the injection. Furthermore, the needle should be kept in constant slow motion while the solution is being injected. The third possible complication is an idiosyncrasy against the drug used. I always employ procaine hydrochloride (novocain). In Mayer's [27] analysis of forty-three unreported deaths from local anesthesia, cocaine was responsible for twenty-six fatalities but procaine hydrochloride, even though it "is used far more frequently than any other local anesthetic, caused only one (possibly two) of the fatalities."

4. The technic is simple and may be employed in a home as well as in a hospital.

5. There is no bad effect on such vital organs as the liver, lungs, heart, circulatory apparatus and central nervous system.

6. No special knowledge is required. The physician himself carries out the procedure and he is therefore not dependent on another individual.

7. No special after-care is required, as is necessary after general and spinal anesthesia.

8. There is a striking reduction of bleeding in the field of operation, so that the amount of blood lost is almost negligible.

9. There is no interference with the action of the uterus, of the abdominal wall, or of respiration.

10. Gastro-intestinal symptoms after operation are uncommon.

11. Patients may take liquids and carbohydrates before, during and after the operation.

12. Infiltration anesthesia enables one to operate on very sick persons and on old ones.

13. There is seldom need to hurry through an operation; hence more attention can be paid to proper suturing.

14. The tissues must be handled gently; this is advantageous to the patient.

15. There is less wound infection, owing to diminished local trauma and to the fact that the patient's general resistance has not been lowered

16. Electrical apparatus such as the cautery may be used without fear of an explosion.

17. It permits the performance of minor operations in a physician's office.

18. It eliminates the fear of an operation in some cases.

INDICATIONS FOR LOCAL ANESTHESIA

The notion that local anesthesia should be used only when there is some contraindication to the employment of general anesthesia is still too prevalent. Therefore, individuals with cardiac or renal disease, pulmonary complications, severe diabetes, toxic goiter, marked anemia and those well advanced in years are the ones chiefly selected as candidates for local anesthesia. In obstetrics, the women especially chosen for this type of anesthesia are those who have pulmonary complica-

26. Frey: Zentralbl. f. Gynäk. **52**:2485 (Sept. 22) 1928.

27. Mayer, Emil: The Toxic Effects Following the Use of Local Anesthesia, J. A. M. A. **82**:876 (March 15) 1924.

tions or toxemia of pregnancy, notably preeclampsia or eclampsia. In gynecology it is the "poor risk" patients who form the subjects. However, local anesthesia is being used more and more by some obstetricians and gynecologists, and it may not be a wild prophesy to suggest that the time will come when, instead of saying "Local anesthesia should be used when general anesthesia is contraindicated," one will say "Inhalation or spinal anesthesia should be employed only when infiltration anesthesia cannot be used."

Obstetric operations that may be performed under infiltration anesthesia are the following:

1. Dilation and curettement for incomplete abortion, therapeutic abortion, hydatidiform mole, missed abortion and other reasons.
2. Spontaneous delivery.
3. Episiotomy and repair.
4. Repair of childbirth lacerations, both recent and old.
5. Low forceps delivery.
6. Cesarean section, classic or cervical type, before or during active labor.
7. Porro's hysterectomy.
8. Anterior vaginal hysterotomy (vaginal cesarean section).
9. Sterilization, abdominal and vaginal.

Gynecologic operations that may readily be done under infiltration anesthesia are the following:

A. Vaginal.
1. Removal of Bartholin gland.
2. Vulvectomy.
3. Dilation and curettement.
4. Anterior colporrhaphy.
5. Posterior colporrhaphy.
6. Repair of third degree laceration.
7. Operations on the cervix, such as amputation or the Sturmdorf operation.
8. The Watkins-Wertheim transposition operation.
9. Repair of vesicovaginal or rectovaginal fistula.
10. Vaginal hysterectomy.

B. Abdominal.
1. Salpingectomy and oophorectomy.
2. Supracervical hysterectomy.
3. Defundation.
4. Suspension of the uterus.
5. Myomectomy.
6. Ectopic pregnancy.
7. Appendectomy.
8. Sympathectomy.
9. Exploratory laparotomy.

TECHNIC

Needless to say the surgical preparation of the vagina or of the abdomen is the same as that when inhalation anesthesia is employed. Usually my obstetric patients are given a hypodermic of one-fourth grain (16 mg.) of morphine and $\frac{1}{200}$ grain (0.3 mg.) of scopolamine about fifteen minutes before the infiltration of the local anesthetic is begun. Thus far I have never seen any harm to the mother or to the baby from this procedure. My impression is that the babies which seem to show the evil effects of morphine are those delivered from two to four hours after their mothers have received the drug. The babies born within an hour of the injection are rarely affected. The patients who are to have gynecologic operations are given one-fourth grain of morphine and $\frac{1}{200}$ grain of scopolamine seventy-five minutes before and one-sixth grain (0.01 Gm.) of morphine and $\frac{1}{200}$ grain of scopolamine thirty minutes before the operation. The narcosis due to morphine persists for a variable length of time after the operation is ended, and this usually ensures sleep or at least comfort for some time after the patient's return to bed.

The patient should be made as comfortable as possible during the operation. Hence abundant pillows should be placed on the operating table, especially under the back and around the shoulders where braces are usually applied. The knees should be tied down gently, but the arms need only be placed in a loose sling alongside the body. Generally a trained anesthetist or a nurse sits at the head of the patient, fans her face if she feels warm, places cracked ice in her mouth if she is thirsty and encourages her from time to time if this is necessary. The operator likewise should talk to the patient occasionally unless the patient tends to become drowsy from the morphine. In this case, no undue noise should be made during the remainder of the operation.

For the local anesthetic, 0.5 per cent procaine hydrochloride is used, although 0.25 per cent is almost as effective. To this solution after sterilization, 2 drops of 1:1,000 epinephrine is added for each ounce. The amount of solution made up will depend on the type of operation to be performed. For small vaginal operations such as episiotomy, repair of lacerations, dilation and curettement, plastic operations and low forceps operations, not more than 4 ounces (120 cc.) is usually necessary. For laparotomies, including hysterectomy and cesarean section, between 6 and 10 ounces (180 and 300 cc.) must be used. It is advisable to make up a little more solution than is usually necessary.

The description of the technic used for the various vaginal and abdominal operations may be found in my previous papers [28] on this subject and those by Gellhorn,[29] one of the pioneers in this field, and by Falls.[30]

CONCLUSIONS

The foregoing comparison between inhalation, spinal and infiltration anesthesia tends to show that infiltration anesthesia is by far the simplest and safest of all types and spinal anesthesia the least satisfactory. It is not urged that infiltration anesthesia be used as a routine for all obstetric and gynecologic operations, but a plea is made for the more widespread use of this form of anesthesia. Increased use of infiltration anesthesia will certainly reduce the incidence of postpartum and postoperative mortality and morbidity.

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ABSTRACT OF DISCUSSION

DR. JOSEPH B. DE LEE, Chicago: Dr. J. Clarence Webster was the first to do a cesarean section in Chicago under local anesthesia. At the Lying-in Hospital we have done eight or nine hundred cesarean sections under local anesthesia. Not one patient has died from the anesthetic. I insist in our hospital that the solution be made by the supervising nurse in the operating room so that there is a direct carrying of the medicine by the nurse to the operating table. When nurses and doctors have the direct care of their patients, they are more particular about details. We have never had pneumonia, bronchitis or edema of the lungs following anesthesia unless the patient was operated on under local anesthesia because of the existence of a bronchitis or a pneumonia. There is an inherent objection to an operation without an anesthetic, inherited from the past. Dr. Greenhill referred to the fact that some people, fearing general anesthesia, will permit operation under local anesthesia;

28. Greenhill, J. P.: Internat. Clin. **4**: 171 (Dec.) 1925; Porro Cesarean Sections Under Local (Infiltration) Anesthesia, J. A. M. A. **90**: 1023 (March 31) 1928; Am. J. Obst. & Gynec. **19**: 613 (May) 1930; Surg., Gynec. & Obst. **53**: 547 (Oct.) 1931; South. M. J. **26**: 37 (Jan.) 1933.

29. Gellhorn, George: Local and Spinal Anesthesia in Gynecology and Obstetrics, J. A. M. A. **61**: 1354 (Oct. 11) 1913; Surg., Gynec. & Obst. **45**: 105 (July) 1927; **51**: 484 (Oct.) 1930; Am. J. Obst. & Gynec. **23**: 908 (June) 1932.

30. Falls, F. H.: Am. J. Obst. & Gynec. **20**: 310 (Sept.) 1930.

but this is the exception. One method that I used to overcome prejudice against local anesthesia was to let the women read affidavits signed before a notary, written by women who had had local anesthesia, a day or two before the operation, so they could talk them over with their friends, and then I would introduce a woman who had been operated on under local anesthesia. Another method was the use of music to get the woman's mind off the operation. It gave them a new slant on the situation. That they could listen to music during an operation was a new idea and did more to win the women over to local anesthesia than listening to the music itself. A great many women did not like the music, as it irritated them. About 50 per cent of the women enjoyed it, and curiously they liked high class music; they did not like jazz or orchestras but chamber music best. I found that Kreisler's Vienna caprice was the most popular of all. Now the radio is available, and since the music in the room annoys me when I operate, I have ear-pieces for the patient. The idea of music in operations is not new. I have a picture of a savage woman in the heart of Africa having a baby while her women friends are sitting around thumping on tom-toms. I don't know whether they are thumping on the tom-toms to drive away the evil spirits or to get her mind off her troubles. Other difficulties come in the operation itself. The doctor must inject his personality into his work. There is no better opportunity than in local anesthesia. One who gets the patient's confidence can accomplish a great deal. Talking during an operation is bad asepsis; one can spit through the mouthpiece and infect the wound. But it is good to encourage the patient with one's voice and one should cover the mouth with an extra two or three layers of heavy cloth. Gentleness is of great importance in operating. One should not pull and tug.

DR. F. H. FALLS, Chicago: Dr. Greenhill didn't stress sufficiently the fact that one may have considerable vomiting and straining during local anesthesia, and many times one has to give up and resort to general anesthesia because of it. As to the question whether local anesthesia ought to be used in a case in which one can just as well use general anesthesia, I would prefer ether anesthesia. It takes longer to do the same operation under local anesthesia and in spite of music and the various methods of distracting the patient's attention, first stressed in this country by Dr. Farr of Minneapolis, many patients do remember certain facts about the operation. They have a certain amount of pain and nervous apprehension, and if one can as well use general anesthesia I believe one should. Unquestionably, local anesthesia increases the operative time. In gynecologic practice, particularly in older women, I think it ought to be stressed that local anesthesia has its greatest value. I have removed an intraligamentous ovarian cyst as large as a basketball in a woman 65 years of age and she did not know that she had been in the operating room. I always precede local anesthesia by the use of morphine, ¼ grain (16 mg.), and scopolamine, 1/150 grain (0.4 mg.), one hour before operation and repeat the scopolamine one-half hour later. The patients come to the operating room so depressed by the morphine and scopolamine that, if local infiltration is added, they frequently have no memory of the operation or of any immediate postoperative discomfort. It is important to remember that one cannot get as good results in a strange hospital, using local anesthesia. I found that operating at the County Hospital it is much more difficult to get the result than it is to get it at my own clinic in the Research and Educational Hospital at Illinois. A trained personnel is required to assist in doing this type of work. Every detail must be carefully followed out and time, patience and gentleness are required of all participants. One must be careful to examine patients that one is going to operate on under local anesthesia for a possible underlying thyrotoxicosis. I had two patients who developed thyroid shock following local anesthesia, in whom the latent goiter symptoms were not noticed preoperatively.

DR. J. P. GREENHILL, Chicago: Dr. De Lee mentioned Webster as a pioneer in the use of local anesthesia. Another pioneer to whom a great deal of credit is due for repeatedly showing the great value of local anesthesia is George Gellhorn of St. Louis. Dr. De Lee reported some bad results with the accidental use of 5 per cent procaine hydrochloride. Most operators who use procaine employ a 0.5 per cent solution, but almost the identical results may be obtained with a one-third or even 0.25 per cent solution. I agree that it is advisable in most cases, but by no means all, to talk to the patient during the operation. A little encouragement now and then is necessary for some patients. A few individuals become drowsy and fall asleep before the operation is ended. Preceding gynecologic operations, the patients are given morphine not later than forty-five minutes before the operation and most of the patients come into the operating room very drowsy. As explained in the paper, chief reliance is placed on morphine for the obstetric patients also. Older women are particularly good subjects, as Dr. Falls brought out. Operations, particularly vaginal ones, may be performed on elderly women without any difficulty at all and most of the patients sleep practically all the time during the operation. I take exception to what Dr. Falls said about the necessity for a trained personnel. I agree that in many hospitals there is difficulty getting proper paraphernalia for local anesthesia, but in reality all that is needed is two or three good syringes and a few long needles in addition to the local anesthetic. The operator himself does all the injecting but he must warn the assistants to be gentle and deliberate in all their manipulations.

LOCAL INFILTRATION ANESTHESIA OF THE PROSTATE PRELIMINARY TO RESECTION

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In the early fall of 1932 we had under our care an elderly patient with a fibrotic contracture of the vesical orifice occurring several years after prostatectomy. Cystoscopic examination revealed no prostatic recurrence but a relatively small amount of scar tissue producing a considerable degree of obstruction. The patient also had marked coronary disease, which, a medical consultant felt, constituted an anesthetic risk out of all proportion to the proposed operative risk of transurethral resection. Using only a topical application of cocaine, we quickly resected four or five small pieces of tissue from the floor of the vesical orifice with the McCarthy electrotome. Save for moderate pain during the time the cutting current was actually in use, the patient did not experience any great discomfort, making an uneventful recovery with satisfactory functional results. In retrospect, it occurred to us that, if the tissue to be resected could be infiltrated with procaine as is done with the needle in the Caulk punch, the operation could be carried out painlessly with no other risk than that entailed by the resection itself.

We therefore made an instrument for this purpose by securing the distal portion of a 21 gage hypodermic needle in the end of a No. 6 ureteral catheter. Using this in a catheterizing cystoscope, we infiltrated the tissue about the vesical orifice with procaine hydrochloride in our next case of contracture and elevation of the vesical orifice. The tissue was resected without pain. Shortly after, we found an earlier report by Frischer describing a similar needle attached to a flexible metal tube which could be used through a cystoscope. Still earlier, in 1926, Hyams devised a method to be used endovesically preliminary to diathermy.

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Read before the Section on Urology at the Eighty-Fourth Annual Session of the American Medical Association, Milwaukee, June 15, 1933.

It then occurred to one of us (W.) that a needle on a straight tube might be substituted for the cutting loop in the electrotome, thus eliminating the use of two separate instruments. Such a needle was made for us by a jeweler. It gave satisfactory results until we attempted to use it on a moderately well developed lateral and median lobe hypertrophy of the prostate. After the first few cuts were made we found that infiltration had not been extensive enough. We then found a description of Ryall's needle for use in his resectoscope in which the needle and lens system travel together during the excursion of the rack and pinion device.

Knowing that suprapubic prostatectomy had been successfully done under local infiltration from above, we felt that transurethral resection under local infiltration anesthesia would be successful if the gland could be injected deeply enough. The fact that the needles we were using operated almost parallel to the long axis of the urethra seemed to offer the explanation as to why the deeper portions did not become anesthetized. If a needle could be introduced into the prostatic urethra and then turned at a right angle to the sheath of the instrument, it could be plunged far enough into the prostate to give anesthesia of proper depth.

An instrument of this principle, designed by one of us (W.), was therefore made and has been used by us. While the needle did not actually operate at a right angle to the resectoscope sheath, it deflected at a sufficiently acute angle so that it would enter at least 1.5 cm. into the prostatic tissue. The details are shown in figures 1 and 2. The outer sheath has the same diameter as the cutting loop and is a little shorter. The back end of this tube is secured by a small key, which slides over the front of the rack of the resectoscope. The inner end comes almost but not quite to the floor

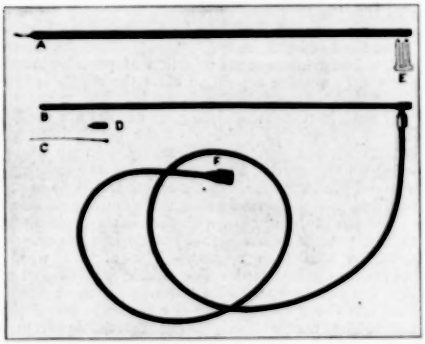

Fig. 1.—Parts of infiltrator: *A*, outer deflecting tube, *B*, inner needle-bearing tube; *C*, needle; *D*, tape that fastens needle to tube; *E*, key that secures outer tube to rack of electrotome; *F*, syringe connection.

of the fenestrum of the resectoscope sheath. This inner end tapers off to a deflecting tube of 18 gage. Into this outer deflecting tube, the needle-bearing tube is inserted before the instrument is fastened in the resectoscope. The needle itself, a 25 gage detachable dental needle of rustless steel, screws on to the end of the inner tube, which is then inserted into the outer sheath. The assembled device is placed into the slot in the resectoscope customarily occupied by the cutting loop. The outer deflecting sheath is secured behind by a key fastened over the rack, while the inner needle-bearing tube slips in behind to the set-screw which usually clasps the electrode. A small tap connected to a short ureteral catheter screws in the side of this needle-bearing tube just in front of the set-screw. The other end of the catheter is attached to a 10 cc. luer syringe. The entire assembled mechanism is then placed in the bakelite sheath of the McCarthy electrotome after the latter has been introduced in the urethra. Thus, when the pinion is pulled clear back, the needle

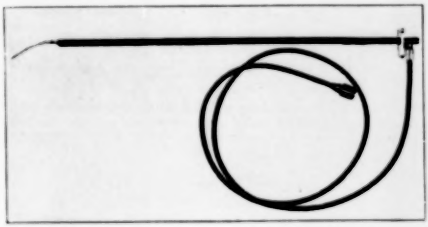

Fig. 2.—Infiltrator, fully assembled, ready to insert in electrotome.

is entirely concealed within the deflecting outer tube so that the resectoscope can be moved to and fro at will. When the desired field is seen in the lens system, the pinion is moved forward. This introduces the needle under direct vision into the prostatic tissue at a sufficiently acute angle so that it penetrates the gland quite deeply, as shown in the roentgenogram of a post-mortem specimen (fig. 3).

Our procedure is as follows: The customary preoperative narcotic is given. Half an hour before operation, 15 cc. of 2 per cent metycaine solution is introduced by catheter into the bladder following thorough vesical irrigation. If previous cystoscopic examination has demonstrated good bladder tolerance to distention, this may be omitted. When the patient is draped, the urethra is irrigated and anesthetized with three 15 mg. cocaine hydrochloride tablets introduced through the Lewis dry applicator. The resectoscope is then placed in the urethra armed with the needle instead of the cutting electrode. Starting on the floor of the prostatic urethra at the margin of the vesical orifice, the needle is introduced into the prostate. After suction has been made with the syringe, to make sure that the needle is not in a blood vessel, 2 per cent solution of procaine hydrochloride (with 0.3 cc. of 1:1,000 solution of epinephrine to 30 cc. of procaine) is injected. From 1 to 4 cc. is usually injected at each introduction of the needle. The needle is withdrawn and reintroduced a little distally. The floor of the prostatic urethra is thus infiltrated outward as far as the verumontanum. The lateral lobes are then infiltrated. Some bulging and blanching of the tissues are noticed if the needle is superficially placed beneath the mucosa. If deeply embedded, such is not the case. It never seriously interferes with vision or subsequent cutting. We have used as little as 6 cc. for the complete anesthesia, and as much as 85 cc. The exact amount required depends on the quantity of tissue to be resected. From 20 to 30 cc. is a fair average. Five or ten minutes is the usual time required. Just as success grows by continued experience with resection, so does the efficacy of anesthesia increase by its continued use.

We have not noted any immediate untoward systemic action from the procedure, nor have we as yet been aware of an intravenous injection. There is usually a slight transient acceleration of the pulse. The infiltration causes little or no pain. We have not observed any increased tendency to postoperative hemorrhage by the use of epinephrine in the solution, though it may give a clearer operative field. We must mention, however, that the only resection we have ever performed which required subsequent cystostomy to control postoperative hemorrhage was done under local infiltration. This occurred six hours after operation, the urine being only faintly pink until a sudden massive hemorrhage developed.

INDICATIONS

Local infiltration produces adequate anesthesia for resection of contracture and elevation of the vesical orifice, median bar and middle and lateral lobe hypertrophy. While we have employed it on large adenomatous hypertrophies, we do not advocate its use in such cases as a routine. We believe that local infiltration anesthesia is particularly useful on patients with some systemic contraindication to inhalation or spinal anesthesia. The immediate risk of these anesthesias to the patient with marked arteriosclerotic heart disease is at times equal to or greater than the operative risk itself. On the other hand, we have not found that local infiltration has any effect on the incidence of postoperative complications (other than those directly connected with inhalation or spinal anesthesia).

Fig. 3.—Roentgenographic appearance of lateral lobes of prostate infiltrated with sodium iodide. Diffuse penetration of solution throughout entire lobe may be noted.

CONTRAINDICATIONS

Extreme vesical intolerance to distention, demonstrated by preliminary cystoscopic examination, constitutes a serious objection to local anesthesia, as does intolerance to urethral instrumentation. While the prostate itself may be satisfactorily anesthetized, the bladder and urethra cannot be so well handled. Very large, adenomatous prostates, the resection of which requires a long time, are not particularly suitable for local infiltration. A series of twenty consecutive resections was completed before we finally had to resort to transsacral anesthesia because preliminary cystoscopic examination and overdistention were so painful. Extremely nervous, excitable or uncooperative patients should not be subjected to resection under local anesthesia. Concurrent diabetes may also be a valid contraindication, though our experience with this is limited to one patient, whose convalescence was uneventful.

COMMENT

Infiltration anesthesia on any part of the body may be unsuccessful; this applies likewise to a certain percentage of prostatic cases. There are, however, other objections which might be raised. Foremost is the possibility of disseminating infected fluid throughout the gland. The needle may be sterile, but its point passes through a potentially infected medium before entering the gland. Indeed, we have found methylene blue, injected experimentally in autopsy specimens, clear out to the periphery of the prostate, though the needle penetrated only 1.5 cm. While our experience is not large, we have found that in actual practice this objection is largely academic. Regardless of the type of anesthesia, a denuded surface follows resection, yet serious infection is the exception rather than the rule. Convalescence is no different following infiltration than after other anesthetics. It is possible, however, that future experience may alter our views.

One might also object that infiltration would produce enough local edema to impair vision or retard cutting. We have had no difficulty with vision. What theoretical problems are presented to the electric current, such as increased resistance, we do not know, but we have not observed any diminution in the electrode's ability to remove loops of tissue when the cutting current is applied. Bleeding is often, though by no means always, somewhat diminished. Coagulation of vessels is not hindered.

Accidental intravenous injection of procaine may be avoided by routine aspiration after the needle is introduced and before injection is made.

If flexible rustless steel 25 gage needles are used, we do not believe that bending of the needle itself constitutes serious danger of breaking. In an autopsy specimen we inserted the needle as far as possible into a lateral prostatic lobe, exactly as one would do in practice, and then deliberately moved the entire resectoscope to and fro in the urethra with the rack and pinion held tightly, exactly as one would not do in practice. The specimen was then opened. The urethra was, of course, badly lacerated. The needle was twisted and bent but not broken. This test was far more extreme than any demands placed on the needle in actual practice. The needle itself, being detachable from its carrier tube, may be changed at each operation if one so desires. We used one needle in fifteen cases, changing it thereafter as a matter of precaution.

RESULTS

We have done thirty-three resections under local infiltration anesthesia. One lasted ninety minutes with good anesthesia to the end, though this is an unusually long duration. The majority experienced only slight discomfort. In only one case did gas have to be administered because of insufficient anesthesia.

The amount of tissue removed at each resection varied from 1 to 20 Gm.

COMPLICATIONS

In this series of resections we have had three serious complications with recovery and two deaths. One patient developed femoral phlebitis two weeks after operation. Another had a postoperative hemorrhage as previously mentioned, while a third had facial erysipelas, with recovery. Erysipelas caused the death of one patient. An epidemic of erysipelas was present at the time and we do not believe that it can be directly charged to the type of operation. The second death was due to hemiplegia twenty-four hours after operation on a man of 85. He had marked arteriosclerosis without hypertension and was uremic on admission to the hospital. His renal function improved with preliminary catheter drainage, so that we thought the risk justifiable. While death was unquestionably an aftermath of resection, we are inclined to believe that the choice of anesthesia was not a factor.

SUMMARY

An instrument is presented to produce infiltration anesthesia of the prostate preliminary to transurethral resection. Its essential feature is that the needle deflects at an acute angle, permitting deeper anesthesia than we have obtained when using needles operating parallel to the long axis of the resectoscope and urethra. Its chief field of usefulness lies in obviating the immediate danger of inhalation, spinal or sacral anesthetics in certain bad risk patients.

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ABSTRACT OF DISCUSSION

DR. G. J. THOMPSON, Rochester, Minn.: The advantages of local anesthesia over spinal or general anesthesia are obvious. Many of the headaches and gastric upsets that occur during and after operation under spinal anesthesia can be avoided by resorting to local anesthesia. During the last two years Dr. Bumpus and I have performed 450 operations and have usually employed spinal anesthesia. In spinal anesthesia for transurethral prostatic resection only a small amount of procaine need be used in most instances, for aged patients metabolize procaine slowly. Recently we used 50 mg. of procaine hydrochloride in 2 cc. of spinal fluid and resected 26 Gm. of tissue in a period of forty-five minutes, the anesthesia lasting very satisfactorily. The disadvantages in this method are the time consumed, the distortion of landmarks by the infiltration, and lack of relaxation of the vesical neck. I am sure the relaxation produced by spinal anesthesia is of great value, for it permits the introduction of the instrument with a small amount of trauma, a factor of great importance in minimizing postoperative fever and toxemia. The necessity of supplementing this method with other forms of anesthesia is the only other disadvantage of which I can think.

DR. H. M. STANG, Eau Claire, Wis.: The idea of local infiltration of prostatic bars or small papillomas at the vesical neck is not new, but the method of doing it was cumbersome and the procedure was not very successful. The authors present an instrument that will prove satisfactory in the hands of men who are doing prostatic resection, and no doubt it will be of benefit in selected cases. Many operators will undoubtedly use the method that they have found successful, the spinal, transsacral or gas-oxygen anesthesia. I do not see any contraindications to this method, except the manipulations necessary and the time consumed in the added manipulation in the urethra.

DR. JULIUS FRISCHER, Kansas City, Mo.: I wish to show that the old needle has been improved on. At first, my chief inducement to the use of prostatic anesthesia was that I would operate under local infiltration. With the advancement of transurethral work, regional anesthesia, such as caudal, sacral and spinal, was added. Even now many patients object to these types of anesthesia but will submit to prostatic resection if I am willing to use local anesthesia. Ninety per cent of my cases have been successfully handled with local infiltration anesthesia. It has been only during the past year that I have employed some regional methods of anesthesia. Preliminary to operative procedure when bladders are infected I have always been careful to have as clean a field as possible. The patients are prepared in the following manner: They are given sodium amytal, 3 grains (0.2 Gm.), on retiring the night before the operation, another 3 grains in the morning, and one-fourth grain (0.016 Gm.) of morphine one hour before the operation. Four separate injections are made through the urethra into the bladder, 1 ounce (30 cc.) of a 2 per cent solution of procaine hydrochloride in physiologic solution of sodium chloride being used. These injections are made at fifteen minute intervals just prior to the operative procedure. For infiltration I make four separate injections of 5 cc. each of a 1 per cent solution of procaine hydrochloride in physiologic solution of sodium chloride directly in the field in which I am resecting or coagulating. Local anesthesia is accomplished by means of a long flexible needle used through the operating cystoscope, the operating urethrocystoscope or the panendoscope. This needle is made of a flexible silver tubing, covered with a spiral sheath which makes it sufficiently resilient to penetrate fibrous tissues. The needle proper is 1.125 cm. long, 20 gage, and the shaft is 9 F. caliber. The entire needle measures 15 inches in length. This added length facilitates local and infiltration anesthesia for other conditions about the ureteral orifices and in the bladder proper. I have found this needle practical because it can be sterilized by boiling, because it accommodates the Luer lock syringe, and because it is flexible yet resilient and is very durable.

DR. GEORGE H. EWELL, Madison, Wis.: At the Detroit meeting I presented a method for transurethral anesthesia and am sorry that many of my friends misunderstood me. I was trying to differentiate between spinal and sacral anesthesia. What I was doing was introducing into the dural sac from 50 to 75 mg. of procaine hydrochloride, and the procedure is carried out with the patient in the sitting posture. It can be done in any space one wishes, for the solution is very heavy and will not run to the tip of the dural sac. If the patient is allowed to remain in the sitting position for ten minutes, one can put him in any position one wishes and the fluid will not travel. I have never yet experienced any change in blood pressure, because the anesthesia does not go above the sacral nerve.

DR. J. A. HYAMS, New York: There is no doubt that anesthesia by direct injection is a valuable aid in the treatment of urethral and urethrovesical pathologic conditions. At the annual meeting of the American Urological Association in Boston in 1926, Dr. McCarthy presented an instrument called the hypodiathermic electrode, devised by me for making such direct injections. The instrument is of two types, one flexible, the other rigid, each threaded for a tiny detachable needle, which can be used for the injection of an anesthetic or the application of diathermy; on the distal portion there are two terminals, one for attachment of a Luer syringe, the other for connection with the cord from a diathermy apparatus. The flexible type is made by Bard & Company, the rigid by the American Cystoscope Makers. They differ very little in principle from the instrument shown by Dr. Frischer. I use the instrument for anesthetizing and the endo-urethral removal of inflammatory tissue excrescences, polypoid cystic elevations and small projecting portions of prostatic tissue remaining after prostatectomy. The use of infiltration anesthesia preliminary to the removal of such cicatricial obstructions as fibrous elevations at the posterior vesical lip and coarctations of the vesical sphincter has advantages. For resection of the larger types of hypertrophy of the prostate, unless warranted by existing conditions, the added traumatism, possible dissemination of infection, and increased danger of secondary bleeding can hardly compensate for the slight difference in risk between this and caudal or transsacral anesthesia.

DR. W. N. WISHARD, JR., Indianapolis: The question of the time element has been brought up. This has never been very great, ten minutes being the usual period. We do not wish to cast any reflections on spinal or caudal anesthesia. We have used both and have had no trouble, but we have always had some apprehension until the patient was back in bed. We have used epinephrine in several cases; it seemed to help in preventing the immediate hemorrhage and did not cause delayed bleeding.

GRANULOMA COCCIDIOIDES

FURTHER OBSERVATIONS ON THE USE OF ANTIMONY AND POTASSIUM TARTRATE AND THE ROENTGEN RAYS IN TREATMENT; REPORT OF AN ADDITIONAL CASE

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AND
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OMAHA

It is our purpose to present evidence supporting that brought forth previously, first by Guy and Jacob[1] and later by ourselves,[2] indicating that antimony and potassium tartrate, given intravenously, combined with roentgen therapy, applied locally, is of value in the treatment of granuloma coccidioides.

In 1927 Guy and Jacob reported the first apparent cure of coccidioidal granuloma by means of these measures. Their patient had shown little or no improvement under various other forms of treatment, including iodides and the roentgen rays. Four months' treatment on alternate days, using a 1 per cent solution of antimony and potassium tartrate in doses up to 7 cc., apparently resulted in complete healing. Roentgen therapy was used during these four months in one-half unit doses at ten day intervals.

A month after treatment was discontinued the disease recurred, but subsided fairly promptly "with a few tartar emetic and roentgen treatments." These authors found that the roentgen treatment alone did not bring about material improvement; they also noted that one of the patient's lesions which was not treated with the roentgen rays while antimony and potassium tartrate was being given did not heal as rapidly as the others. In other words, it seemed to them that the two procedures were complementary.

In 1928, having followed this plan of treatment, we reported "definite improvement and possible cure" in a case of granuloma coccidioides in a patient who had contracted the disease while working with the fungus coccidioides in the laboratory.

A brief review of our previous report and the progress in this case to date follow.

REPORT OF CASES

CASE 1.—P. B., a man, aged 26, a fellow in the department of bacteriology at the University of Nebraska, after a prolonged period of research with Coccidioides immitis, became ill with moderate chills and fever, general malaise and a hacky cough which on one occasion was productive of blood-streaked sputum. Within two weeks of the onset of these symptoms an abscess developed on the plantar surface of the left foot. This was incised and drained. The fungus coccidioides was recovered in the fresh preparation of pus by culture and through inoculation into a guinea-pig. Three months' treatment on alternate days with doses of from 2 to 8 cc. of a 1 per cent solution of antimony and potassium tartrate given intravenously and one-half skin unit of unfiltered roentgen rays at intervals of from ten to fourteen days produced complete healing.

No further difficulty was experienced until May, 1931, almost four years after the original trouble, when the patient again became ill with chills and fever. One week after the onset of these symptoms a filbert-sized nodule appeared about the mid-outer surface of the left leg from which pus containing the fungus coccidioides was aspirated. We immediately returned to the use of antimony and potassium tartrate and roentgen treatment in the manner previously described, and healing was complete in four weeks.

The patient has appeared to be in excellent health during the past two years, but we have continued to give him biweekly injections of the solution of antimony and potassium tartrate in doses of 5 cc.

Comment.—In view of this patient's prolonged laboratory contact with the organism and the prodromal illness marked by cough and bloody sputum, we believe it can be reasonably assumed that this case began as a pulmonary coccidioidal infection, the result of inhaling spores of the fungus in the laboratory.

It is to be noted that although the original attack was of several weeks' duration when the diagnosis was established, this treatment resulted in complete healing of the foot and apparent normal health over a period of four years. Early recognition and treatment of the recurrent attack resulted in complete healing within four weeks, and the patient has been in excellent health during the past two years. This succession of events points to the efficacy of this treatment, and we think also suggests a probable need for carrying treatment quite indefinitely beyond the stage of complete healing of the lesions.

Fig. 1 (case 2).—Ulcers on the knees, before treatment.

CASE 2.—F. P., a white American-born boy of 7, was brought to one of us (C. C. T.) on June 25, 1929, because of ulcers on the knees. The family history and past history were essentially unimportant.

One year before the patient was brought to us he had abraded his knees on a concrete driveway. Within a few days after this accident he was taken on a two weeks automobile journey through Texas and Louisiana. From the time he left Omaha until he returned, superficial ulcerations developed at the site of the abrasions on the knees, which during the succeeding weeks became larger and deeper and drained a great deal of pus. He was placed in a local hospital, where he remained almost continuously from early October, 1928, until late June, 1929, during which time various types of treatment, including roentgen therapy, wet dressings, ointments, cautery and excision, failed to influence the progress of the ulcers.

When seen by us on June 25, 1929, he was markedly anemic and undernourished. His oral temperature was 100 F. Our examination revealed four ulcers about the left knee and five

Studies and contributions of the Department of Dermatology and Syphilology, University of Nebraska College of Medicine.
Read before the Section on Dermatology and Syphilology at the Eighty-Fourth Annual Session of the American Medical Association, Milwaukee, June 16, 1933.

1. Guy, W. H., and Jacob, F. M.: Granuloma Coccidioides, Arch. Dermat. & Syph. **16**: 308 (Sept.) 1927.
2. Tomlinson, C. C., and Bancroft, Paul: Granuloma Coccidioides, J. A. M. A. **91**: 947 (Sept. 29) 1928.

about the right knee, varying from 2 to 10 cm. in diameter, with several smaller satellite ulcers between and about the larger ones. These ulcers, roughly oval in outline, were of a distinctly crateriform type, each having a granulomatous base and being covered by a firmly adherent thick purulent crust. There were marked contractures of both knees (fig. 1).

Search for coccidioidal organisms in the pus (fresh alkali preparation) was negative. Cultures on Sabouraud's medium showed a moist growth on the fourth day. Animals were inoculated with fresh pus from the ulcers and from the culture material. In these animals, lesions developed in which the spheroidal double-contoured refractile bodies characteristic of Coccidioides immitis were found (fig. 2).

Treatment, in addition to general supportive measures, consisted of wet dressings with a weak solution of corrosive mercuric chloride, roentgen therapy and intravenous injections of antimony and potassium tartrate. Each lesion was treated with from one-fourth to one-half skin unit dose of unfiltered roentgen rays at intervals of from seven to thirty days, a total of ten such treatments being given. Sixty-two intravenous injections of antimony and potassium tartrate were given over a period of one hundred and eighty-four days, the usual interval being three days, and the longest interval, twenty-eight days. A 1 per cent solution of antimony and potassium tartrate was employed in doses of 5 cc. No untoward reaction was noted.

From the beginning there was slow but definite improvement. The ulcers became clean and healthy looking within six weeks from the beginning of treatment, but owing to their size some of the larger ulcers required eight months for complete healing. There has been no recurrence, and the patient is now a strong, active boy showing only scars of the healed ulcers (fig. 3) as evidence of his previous trouble. He has had no treatment of any kind since Dec. 25, 1929.

Comment.—We are not at all certain as to the portal of entry in this case or as to the time the infection was acquired. In regard to this case, however, we are quite certain of two things: First, that no treatment that the patient received over the fifteen months period prior to the time we saw him had any curative value. Second, that after he was started on intravenous injections of antimony and potassium tartrate and roentgen therapy,

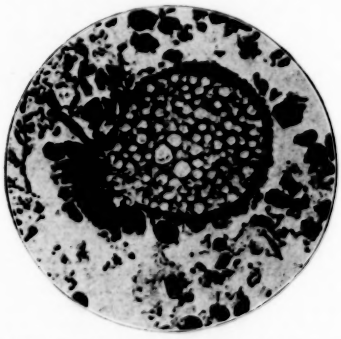

Fig. 2 (case 2).—Coccidioides immitis: section from a guinea-pig inoculated with material from the patient's ulcers.

he improved steadily until healed, and has had no manifestation of the disease since treatment was completed three and a half years ago.

CASE 3 (This case was previously reported by Zeisler [3]).—E. J. S., a man, aged 38, was seen twelve days prior to his death by suicide. During the last year of his life the patient received many types of treatment, including antimony and potassium tartrate and roentgen therapy, and although Zeisler's report would seem to indicate rather definite improvement following the use of antimony and potassium tartrate and roentgen therapy, it is our opinion that had these measures been used to the exclusion of others over a longer period of time, better results might have been obtained. During the twelve days he was in our care he received one-half skin unit

Fig. 3 (case 2).—Scars of healed lesions three years after treatment was completed.

of roentgen rays and eight doses of 5 cc. each of a 1 per cent solution of antimony and potassium tartate, which in this short time brought about definite improvement of all the lesions.

Comment.—We believe that this case is of little value in our report and include it only for the sake of completeness.

CONCLUSIONS

We believe that our first two case reports are evidence that prolonged treatment with intravenous injections of antimony and potassium tartrate and local roentgen therapy is effective in the treatment of granuloma coccidioides. Admitting that our two apparent cures and that of Guy and Jacob do not supply conclusive evidence, we know of no other report in which comparable results have been sustained over a period of several years. We are convinced that the treatment must be continued for a long time.

ABSTRACT OF DISCUSSION

DR. GEORGE M. LEWIS, New York: Granuloma coccidioides has probably shown the highest mortality and has proved the most resistant to therapy of all the rarer mycoses. The iodides, which are of great service in many fungous diseases, are of little value here. Although the report does not contain a large series of cases, this does not detract from the observations, since the authors are dealing with a notoriously persistent and progressive disease with no likelihood of spontaneous cure. Nor does the well established curative effect of other remedies, such as colloidal copper and coccidioidin, mean that an ideal treatment is known. From the reports of Jacobson and many others it is evident that roentgen therapy, colloidal copper and coccidioidin do not cure every case of granuloma coccidioides. It is thus possible that some patients will do well on this regimen and other patients will respond more favorably to the combined use of x-rays and antimony and potassium tartrate. A remarkable feature in the first case history was the interval of four years between the complete subjective and objective disappearance of the disease and the subsequent development of new lesions. The question arises whether the infection remained dormant during this interval, as in syphilis, or the patient became reinfected. Because of the first possibility, the

3. Zeisler, E. P.: Chronic Coccidioidal Dermatitis, Arch. Derm. & Syph. **25**: 52 (Jan.) 1932.

authors do well to emphasize the importance of continuing treatment long after all evidence of the disease has disappeared. This is in line with the recognized management of other deep fungous infections, such as actinomycosis and sporotrichosis, in which relapses may occur if therapy is discontinued coincidentally with the disappearance of the skin manifestations.

DR. ERWIN P. ZEISLER, Chicago: I should like to comment briefly on the patient the authors mentioned who had been under my care at the Cook County Hospital. The lesions in this case were entirely dermal and were unusually extensive. No pulmonary, osseous or subcutaneous involvement could be demonstrated. Before the patient came to me, many different methods of treatment had been used, including the arsphenamines and iodides. During a period of three months I administered antimony and potassium tartrate alternating with colloidal copper, with complete retrogression of the lesions, and I thought that the patient was cured. He remained well for three months, but at the end of that time new lesions developed which did not respond to further treatment. Regarding the efficiency of the drugs used, I had difficulty in arriving at any conclusion, but it seemed that colloidal copper was better than antimony and potassium tartrate. One preparation of colloidal copper sulphide made in Chicago was tried and proved to be entirely ineffective. A French preparation was found to be the most effective but, unfortunately, was very expensive. The one thing I have learned about the treatment of coccidioidal granuloma is that the treatment must be prolonged even after apparent cure takes place and I believe that the combination of roentgenotherapy with these two drugs will give the best results. Another point is that the few cases reported as cured were purely dermic. I think that no case presenting pulmonary lesions has been cured; a few cases of osseous involvement have been cured by amputation.

DR. HOWARD MORROW, San Francisco: I concur in Dr. Zeisler's remarks that these cases are not cured even when we consider them cured. In California we see a great many cases of granuloma coccidioides and have come to consider the prognosis very serious. It has been our experience that 60 per cent of the patients die within a few years. When a patient is fortunate enough to have lesions on a limb only, amputation may cure the disease; but such cases are rare. I have tried antimony, vaccines made from the fungus, copper, typhoid vaccines and pyotherapy but am of the opinion that nothing will cure granuloma coccidioides. Occasionally I see a patient in whom a certain resistance has been built up against the infection, and I have wondered whether the fungus was of a low-grade virulence, but I have come to the conclusion that it is not a case of virulence of the organism but of resistance on the part of the patient. Some years ago I had a seafaring man who had coccidioides of the knee. He had his thigh amputated and apparently remained well for fifteen years. He also had a mild papular and pustular dermatitis of the brow and upper eyelid, cultures of which yielded the Coccidioides organism. I could not understand why this eruption did not clear up under therapy or why the disease did not progress. I thought that the virulence of the organism was low, but on animal inoculation this pus proved to be just as virulent as the most rabid type of Coccidioides. Therefore, I came to the conclusion that it was a natural resistance. The patient still has the mild papulopustular eruption of the brow and upper eyelid. Cultures still show the fungus, and he still seems to be in perfect health. Perhaps the primary lesion on the knee enabled him to build up a resistance.

DR. FRED D. WEIDMAN, Philadelphia: Reports of this kind open the question whether it is the resistance of the host against the organism that is responsible for cure, or whether species of different (attenuated) virulence are concerned. Turning to granuloma coccidioides in particular, the South Americans have written much that bears on today's paper. Recently Almeida has pointed out that there are different organisms concerned in what has been reported as coccidioidal granuloma in Brazil. Dr. Jordon of my laboratory has imported these organisms from South America and compared them with North American strains. I now can confirm the contention of Almeida. In South America there are two or perhaps three forms. The first is identical with what is found in North America. The second is an entirely different organism and the disease is also different clinically. It produces very scanty lesions in animals, the disease runs a mild course and is amenable to treatment with antimony and potassium tartrate; hence the reports from South America of successful results with this treatment must be taken with reservations, for what they are treating there is for the most part an entirely different disease. However, I can vouch that this organism, Paracoccidioides braziliensis, was not concerned in Tomlinson and Bancroft's case. I had the good fortune to be mixed up with the original case of cure of coccidioidal granuloma reported by Guy and Jacob. That patient had coccidioidal arthritis four years ago. Recently Dr. Guy told me that the man is now in apparently good health. I recall that the organism was comparatively nonvirulent for laboratory animals. Contrary to the usual results, the lesions consisted simply of a multiple serositis. Probably there are other differences in virulence, but this is the only case I have known in which a definite difference was demonstrated; and this was a genuine case of Coccidioides immitis infection—not the Brazilian disease. I feel sure that one may get organisms of lower virulence within a fungus species, but as Dr. Morrow stated, cure cannot be expected consistently in coccidioidal granuloma.

DR. CHARLES C. TOMLINSON, Omaha: Answering the question as to whether the second attack in case 1 was a new infection or the lighting up of a dormant infection, we feel quite sure that it was the latter, as this is quite the usual history in this disease. Dr. Morrow favors amputation when the disease is confined to an extremity, but in our case 1 we reasoned that the primary focus was pulmonary and that amputation would not necessarily protect against development of the infection in other locations. I cannot quite understand why Dr. Zeisler favors colloidal copper, as his report states that his case cleared up and remained clear for a period of three or four months following treatment with antimony and potassium tartrate. Having seen two cases become symptom free and remain so under this plan of treatment, we feel convinced of its efficacy and want to encourage its use, particularly by the men from California, who see this disease most frequently.

BILATERAL CORONARY OCCLUSION WITH MITRAL STENOSIS

WITH A CONSIDERATION OF THE COMPENSATORY CIRCULATORY FACTORS IN THE HEART

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An example of both mitral stenosis and bilateral coronary occlusion has not been found in the literature. The case reported here, presenting a tight mitral stenosis and an occlusion of all the main coronary arteries, furnishes an interesting example of the remarkable potentialities of the various compensatory mechanisms of the heart and its blood supply.

REPORT OF CASE

S. B., a white man, aged 63, a tailor, was admitted to the Brooklyn Jewish Hospital in the general medical service of Dr. Joseph Rosenthal, complaining of generalized weakness, dyspnea on exertion, and edema of the ankles.

Three years before, he had an attack of pain over the precordium and shortness of breath. He was taken to a hospital, where he stayed three weeks. Since then he had remained quite well and was able to go to work daily. Slight dyspnea on exertion was the only symptom that persisted. About three weeks before admission he first noted increasing generalized weakness, with increasing dyspnea, which forced him to stop working one week later. At this time he first noted swelling

of the ankles, which became progressively more marked. There was no precordial pain nor palpitation of the heart. Questioning regarding symptoms referable to the various tracts revealed nothing of note. There was no history of a venereal infection.

The patient was poorly developed and appeared moderately ill. He had a pale, muddy complexion. Slight cyanosis and dyspnea were present. The temperature was normal, pulse 80, respiration 20, blood pressure 110 systolic, 74 diastolic. The patient was found to be a hyposensitive type by Libman's test. A moderate sclerosis of the vessels of the eyegrounds was present. The heart was found to be of normal size by percussion. The apex impulse was diffuse, in the region of the midclavicular line in the left fifth interspace. The heart sounds were rather distant. A moderate extrasystolic irregularity was present. There was a prolonged mid diastolic murmur at the apex. Dulness was present over the left base, and flatness over the right base of the lungs. At the former area, moist crepitant rales were present, while breath sounds were entirely absent at the latter area. The liver edge was palpable from two to three fingerbreadths below the costal margin. No fluid in the abdomen was perceived. A moderate pitting edema of both legs and arms was present.

A gallop rhythm was present, associated with a murmur during the gallop, which suggested a diagnosis of mitral stenosis with a prolonged PR interval. Electrocardiographic tracings the next day revealed a partial auriculoventricular block consisting of a PR interval of 0.26 second and occasional dropped beats. The complexes were all of low voltage, the highest QRS being 5 mm. A definite right axis deviation was present. The T waves were diphasic in leads I and II and inverted in lead III. A teleroentgenogram of the heart showed a slight increase in the transverse diameter and a flattening of the left border suggestive of mitral stenosis. There was an increase in the lung markings in both bases and evidence of a small amount of fluid in the costophrenic sinus. Wassermann and Kahn tests were negative. There was slight fever up to 101.8 F. from the fourth to the eleventh day of his stay in the hospital.

Salyrgan, 1 cc., was injected intramuscularly shortly after admission and repeated every five days. Ammonium chloride, 20 grains (1.3 Gm.) three times a day, and digitalis, 2 grains (0.13 Gm.) twice a day, were administered. A favorable water balance was soon obtained, and improvement thereafter was marked. By the end of the second week of his stay in the hospital, the edema had disappeared, the liver had receded so that it was barely palpable under the costal margin, and the signs in the chest had cleared. For the last five days in the hospital the patient was up and about with no symptoms whatever. He was discharged from the hospital three weeks after admission feeling perfectly well and having no signs of decompensation. The diagnosis on discharge was rheumatic fever (inactive), generalized arteriosclerosis, mitral stenosis and insufficiency, coronary sclerosis, fibrosis of the myocardium, and congestive failure improved.

The patient walked out of the hospital in high spirits but on entering a taxicab he suddenly fell. On examination immediately afterward, he was pronounced dead.

At autopsy the lesions found besides those of the heart were infarctions in the lung, chronic cholecystitis, fatty degeneration of the liver, cyst in the pituitary gland, and cerebral edema and congestion.

The heart weighed 330 Gm. It was spherical and measured 8 cm. from the base to the apex of the ventricles. The visceral epicardium showed patches of thickening, but no adhesions and no fresh pericarditis were found. Both atria and the right ventricle were somewhat dilated and hypertrophied. The foramen ovale was closed. Some fresh adherent thrombi were present in the right auricular appendage and at the apex of the right ventricle. The myocardium besides that of the left ventricle was everywhere of normal appearance, no areas of softening, necrosis, fatty changes nor fibrous streaks being present. Microscopic examination revealed, however, a slight increase of the interstitial tissue, small patches of fibrosis, localized areas of sparse lymphocytic infiltration, and a slight granular degeneration of the muscle cells.

The changes in the left ventricular wall, for the most part, were grossly of fibrous nature. The fibrosis appeared localized mainly in two areas; one of these was at the apex anteriorly, where the ventricular wall was thinned to 5 cm. and the muscle was almost completely replaced by silvery firm fibrous tissue. The other area was at the base adjacent to the septum posteriorly. There was some fibrosis connecting these areas along the posterior wall of the ventricle near the septum. The remaining musculature showed no fibrosis but was dark red, and small streaks of purplish red were present occasionally throughout, except for the basal portions, which appeared entirely uninvolved. There were no areas of softening or necrosis. The fibrotic changes extended to the septum, so that its posterior third and its entire apical portion were involved. The remaining part of the septum showed no changes. Microscopically all the sections of the left ventricular myocardium presented varying degrees of fibrosis, which was the outstanding change. The fibrous tissue showed a varying degree of cellularity in scattered areas. Some portions had only a few elongated nuclei and disintegrated nuclei; others showed an infiltration of round cells and fibroblasts. The tissue contained, furthermore, many channels of various sizes lined with endothelium and containing blood cells. Throughout all the sections of the myocardium there was present a moderate amount of lymphocytic infiltration, which appeared to be most marked about the blood vessels. There was no evidence anywhere of fresh infarction. No localized areas of congestion, necrosis or polymorphonuclear infiltration were present. The individual muscle cells showed various stages of degeneration roughly proportionate to the amount of fibrosis surrounding the fibers. In the uninvolved areas the muscle cells appeared normal or sometimes showed hypertrophy of the cells with large hyperchromatic nuclei. The small arteries, except for occasional splitting of the internal elastica, appeared normal.

The right coronary circumflex artery was thickened and markedly calcified throughout its course, and numerous small atheromatous areas were present on the intimal surface. The lumen was completely occluded with organized thrombi in two places. One was immediately at the orifice for a distance of 1 cm. and the other was about 5 cm. from the orifice, also for a distance of 1 cm. The most marked calcification was present in the latter thrombus, which thus appeared to be the older. Beyond the second point of occlusion the changes in the artery were less marked. There were similar pathologic changes in the left coronary artery, but they were much greater in degree, so that the left circumflex artery was converted into a solid and calcified cord for its entire course and the left descending artery was similarly involved for a distance of 3 cm. about 2 cm. from its opening. Beyond this closure the lumen was markedly narrowed, and before the closure no branches were noted arising from the artery. Sections of both arteries revealed evidences of recanalization in the form of occasional lumens, pinpoint to almost pinhead in diameter. In the portions of the arteries that showed a lesser degree of damage there was microscopically present a thinning of the media and a slight degree of fibrosis. In some areas the internal elastica was split, and there was some increase in the subendocardial connective tissue. In the portions more extensively involved there were large areas of calcification and extensive hyalinization involving the entire media. This layer in some places was markedly thinned to almost linear dimensions. The lumen was filled with old thrombi consisting of hyalinized tissue containing vascular channels of various sizes.

The tricuspid, pulmonary and aortic valves grossly were normal. Their rings measured 10, 7 and 6 cm., respectively. The mitral valve was the seat of a marked stenosis producing an orifice only 1 cm. in circumference. The cusps were markedly thickened and calcified. No vegetations were present. Microscopically this valve showed the typical reduplication of elastic and fibrous lumens on the auricular surface considered to be characteristic of rheumatic involvement. The same reduplication of layers was present also on the aortic valve on its ventricular surface.

Serial sections were taken of the division of the bundle of His into its two main branches. Nothing more than marked swelling of the Purkinje fibers was found. The adjacent septal musculature showed extensive fibrotic changes separating the muscle fibers into small islands.

COMMENT

The pathologic changes indicate that in this heart with mitral stenosis there had been for several years a progressive arteriosclerotic narrowing of the vessels and a series of thromboses leading finally to occlusion of the main coronary arteries, which in turn existed for a fairly long time. That actual infarctions of large areas had taken place at least twice is indicated by the localized areas of fibrosis, one at the base and the other at the apex of the heart. The absence of evidence of a recent thrombosis or a fresh infarction indicates that the heart was able to survive the insult that was the final stroke in occluding all the main coronaries. That the heart apparently was able to compensate fully in the presence of this pathologic condition is one of the most interesting features of this case. The edema disappeared, the liver receded, the patient was up and about for several days without symptoms, and then he walked out of the hospital at a time when the coronaries were solid and calcified cords and a buttonhole mitral stenosis was existing.

Since recanalization of the thrombi was relatively slight and inconstant, only a small amount of blood could reach the capillary bed this way, and other means must be looked for whereby the heart was able to obtain its nutriment. As Pratt [1] suggested, the heart may conceivably absorb nutritive elements through its endocardial surface directly from the blood stream; but the nutriment gained this way is necessarily limited. Hudson, Moritz, Wearn and Orgain [2] have recently emphasized the rich potentials of the extracardiac coronary anastomoses for compensating for coronary occlusions, especially when extensive pericardial adhesions exist. That a large amount of blood entered the patient's heart in this manner is questionable, since the coronaries were occluded for long distances and no pericardial adhesions existed. Batson and Bellet [3] have recently shown that, in coronary occlusion, blood may pass during atrial systole from the atria through the coronary veins directly into the capillaries. With the onset of ventricular systole, this blood is forced back to the veins, thus producing a flow and ebb circulation. However, the time periods of the heart cycle, the low initial pressure and velocity of the venous blood, and the length of the vascular bed of the heart are such that make it very improbable that more than a small quantity of blood can be furnished to the myocardium in this manner. Wearn [4] and Grant and Viko [5] have demonstrated in the human heart the extensive ramification of the thebesian vessels, which are small channels connecting coronary veins and capillaries with the chambers of the heart. These vessels have numerous ostia in all four chambers and can transmit blood directly into the capillary bed through many short channels from endocardium to myocardium. Furthermore, in the presence of complete coronary occlusion the thebesian system can act in this regard throughout diastole as long as the intraventricular pressures remain positive. The thebesian vessels bring arterial as well as venous blood to the capillaries. Wearn [6] considered the thebesian system the main source of blood supply to the heart in two cases in which the coronary orifices were completely occluded by syphilitic processes. In a heart described recently by Bellet,[7] the large veins as well as the large coronary arteries were completely destroyed by tuberculous myocarditis, and the myocardium was nourished through the thebesian vessels.

When one considers that of all the cases of coronary occlusion the one of the very few that survived complete occlusion should be a heart with such a rare combination with mitral stenosis, one realizes that it is unlikely that such a finding is purely a matter of coincidence but that the stenosis possibly plays a beneficial rôle in coronary occlusion. One of the reasons may be an increased intra-atrial pressure supplying a greater amount of blood through the coronary veins to the capillaries. The prolonged PR interval in this case helped matters in this regard. Another possibility is that the tight mitral stenosis relieved the infarcted or fibrotic left ventricle of some of the strain of the circulation. In experimentally produced mitral stenosis, Katz [8] described, among other changes, a decrease in the maximum pressure and a marked abbreviation of ejection and systolic time in the left ventricle. Various compensatory mechanisms, however, soon tend to restore conditions to normal. Although it is problematic to what extent the left ventricle is relieved of its normal strain by these changes and their compensatory mechanism in clinical cases of tight mitral stenosis, nevertheless it is not unusual for the left ventricle to be found smaller than normal in these hearts. From these considerations, it might follow that if an individual survives a mitral stenosis long enough to reach the age of coronary occlusion, the former may be an aid to him in combatting the consequences of the latter. The rarity of such combined lesions, however, has prevented statistical studies on this point.

In cases of occlusion of one of the coronary arteries, all the emphasis has been placed on the rôle played by arterial anastomoses in furnishing blood to the infarcted area, and other mechanisms have received little attention. The importance of the latter in this regard is emphasized in the reported heart, which recovered from its last thrombosis at a time when all interarterial anastomoses could be of little avail. Considering the rôle the coronary veins play in thrombosis of one of the coronary arteries, during the period of fall of arterial pressure sufficient to permit a reversal of flow in the cardiac veins, the heart is in a critical state, and such marked physiologic changes in its circulation would be productive of additional grave dangers. However, the thebesian circulation can theoretically be relegated to a position of great importance in supplying blood to infarcted areas following isolated coronary insults. The anatomic arrangement of the thebesian vessels appears to be such that it can more quickly and effectively furnish blood to an area shut off from the normal supply than can the arterial anastomoses. The thebesian system can bring blood directly to the central portions of the infarcted areas from a very short distance through existing vascular channels, whereas arterial anastomoses must furnish blood from

1. Pratt, F. H.: Factors Actual and Possible in Cardiac Nutrition, Boston S. & M. J. **190**: 304-307 (Feb. 21) 1924.

2. Hudson, C. L., Moritz, A. R., and Wearn, J. T.: The Extracardiac Anastomoses of the Coronary Arteries, J. Exper. Med. **56**: 919 (Dec.) 1932. Moritz, D. R.; Hudson, C. L., and Orgain, E. S.: Augmentation of the Extracardiac Anastomoses of the Coronary Arteries Through Pericardial Adhesions, ibid., p. 927.

3. Batson, O. V., and Bellet, Samuel: Reversal of the Flow in Cardiac Veins, Am. Heart J. **6**: 206-224 (Dec.) 1930.

4. Wearn, J. T.: Rôle of the Thebesian Vessels in the Circulation of the Heart, J. Exper. Med. **47**: 293 (Feb.) 1928.

5. Grant, R. T., and Viko, L. E.: Observations on the Anatomy of the Thebesian Vessels of the Heart, Heart **15**: 103-123 (Aug.) 1929.

6. Leary, Timothy, and Wearn, J. T.: Two Cases of Complete Occlusion of Both Coronary Orifices, Am. Heart J. **5**: 412-423 (April) 1930.

7. Bellet, Samuel; Gouley, B. A., and McMillan, T. M.: The Nourishment of the Myocardium Through the Thebesian Vessels in a Heart in Which the Large Coronary Arteries and Veins Were Destroyed by the Tuberculous Myocarditis, Arch. Int. Med. **51**: 112-121 (Jan.) 1933.

8. Katz, L. N., and Siegel, M. L.: Cardiodynamic Effects of Acute Experimental Mitral Stenosis, Am. Heart J. **6**: 672-682 (June) 1931.

the borders of the areas through vascular channels that must take time to form. In cases associated with marked fall of arterial pressure, the thebesian system is in an especially advantageous position in this regard. It may be suggested, furthermore, that the constancy of areas of infarction in certain areas of the heart, i. e., at the apex anteriorly and at the base posteriorly, may possibly be due in some measure to variations in the ramifications of the thebesian system or a diminution in the number of endocardial orifices in these areas, producing a relatively ineffectual thebesian blood supply in these areas. There is no record of anatomic investigations on this point.

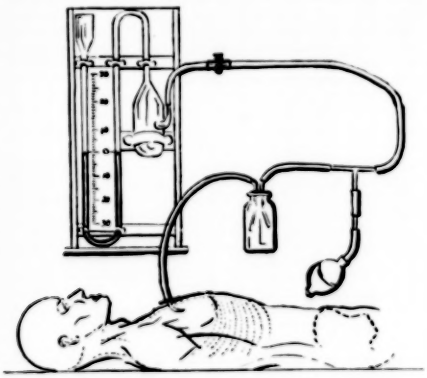
1487 President Street.

Clinical Notes, Suggestions and New Instruments

AN APPARATUS FOR THE EVACUATION OF AIR IN SPONTANEOUS PNEUMOTHORAX

ELLIOTT P. SMART, M.D., OLIVE VIEW, CALIF.

Spontaneous pneumothorax is a serious accident often leading to death from asphyxia. Usually a complication of pulmonary tuberculosis, especially after artificial pneumothorax has been instituted, it may also result from emphysema, congenital cysts of the lung, or traumatic injuries. It is particularly dangerous when the collapse of the lung is sudden and severe, or when a valvelike flap at the site of rupture causes a flow of air from the lung into the pleural cavity but prevents its escape, thus



Apparatus for evacuation of air in spontaneous pneumothorax.

building up a positive pressure, and in instances of bilateral pneumothorax, induced or spontaneous. The resulting asphyxia demands the immediate and continued withdrawal of air from the chest. Simple aspiration with an ordinary syringe and needle, or the insertion of a cannula into the chest, may avail at times, but repeated or even continuous aspiration is often required. Several such cases developing at the Olive View Sanatorium led to the construction of the apparatus here described, which has been found to be both convenient and efficient and has already saved lives.

The apparatus consists of a curved antrum trocar and cannula (Pierce's), which is inserted into the pleural cavity and turned so that its end will not abrade the surface of the lung. The cannula is then stitched to the chest wall through its perforated flange, and further sealed at the site of puncture by the application of cotton and collodion, and strapped into place by adhesive tape, which is carried tightly from the spine to the sternum to prevent subcutaneous emphysema from pushing the cannula out. The trocar is then removed from the cannula and an adapter with tubing attached is inserted. A trap and a cotton filter are interposed between the cannula and a rubber bulb, which is fitted with valves allowing the air to flow in one direction only, outward. An ordinary atomizer bulb, with its connections reversed, may be used for this purpose. A T glass tubing connects with a manometer, which can be shut off when the readings are not being taken.

The rubber bulb is placed within the patient's reach and he is instructed how to read the manometer and how to work the bulb whenever the positive pressure becomes too high or when he feels short of breath. In this way subcutaneous emphysema and impairment of respiration from excessive collapse of the lung or displacement of the mediastinum can be kept under control, pleural effusions that develop may be removed (none have been experienced to date), and either neutral or slight positive pressure maintained, facilitating an early closure of the ruptured lung. In actual practice it has proved to be a great therapeutic aid to the physician, as well as a great relief to the patient, who gains confidence and security from the knowledge that he can control the situation himself.

From the Olive View Sanatorium.

THE PREVENTION OF DIPHTHERIA AND SCARLET FEVER IN NURSES

LUDVIG HEKTOEN, M.D., AND CHARLOTTE JOHNSON, R.N., CHICAGO

Our purpose in this note is to complete the records of the prevention of diphtheria and scarlet fever among the nurses in the Durand Hospital, which was closed, at least temporarily, at the beginning of this year. Since the opening of the hospital in March, 1913, special efforts have been made to protect the nurses against the infectious diseases with which they were dealing and especially diphtheria and scarlet fever. As tests for susceptibility and immunization of susceptibles developed, these methods were applied to the nurses. Accurate records of the health of the nurses while in the hospital have been kept. The capacity of the hospital was sixty beds. Only patients with acute infectious diseases (mostly diphtheria and scarlet fever) were received. At first the nursing was done principally by graduate nurses, but after the end of the second year the bedside nursing was in the hands of student nurses working under the direction of trained supervisors. Nearly all the student nurses came to the hospital for three months from other hospitals in Chicago and vicinity. They were in no sense seasoned nurses but mostly recent arrivals in Chicago; the age varied from 19 to 35 years, the average being about 23. Special care was taken to maintain a high degree of cleanliness of patients and surroundings; from the start the nursing procedure was organized precisely and supervised rigidly to prevent as much as possible the spread of infectious material. The health of each nurse was watched closely; nose and throat cultures were made regularly each week. The general conditions under which the nurses lived and worked did not change in any marked degree during the period in question. During this period, 3,673 cases of diphtheria and 5,416 cases of scarlet fever were treated in the hospital under the direction of Dr. George H. Weaver. Except as determined by chance, each student nurse came into equally close contact with diphtheria and scarlet fever patients. Selective or exclusive assignments of the nurses were not made. In 1928 a report [1] was published on the incidence of diphtheria and scarlet fever among these nurses up to Dec. 1, 1927. That report gives in detail the rules and suggestions for the protection of nurses and others. Practically the only difference between that report and this is that now the figures for the period after Dec. 1, 1928, have been added. Table 1 shows that, of 349 nurses originally insusceptible (negative Schick test), six developed diphtheria; that of these 349 insusceptibles the 192 in the period 1921 to

From the John McCormick Institute for Infectious Diseases.

1. Hektoen, Ludvig, and Johnson, Charlotte: Prevention of Diphtheria and Scarlet Fever in Nurses, J. Prev. Med. **2**: 289 (July) 1928.

the closing of the hospital did not have a single case of diphtheria; that of 397 susceptibles (positive Schick test) immunized to negative Schick test before entering on duty, one had diphtheria, and that of all the nurses in this tested and immunized group, 802 in all, 7, or 0.89 per cent, had diphtheria. It should be pointed out that no cases of diphtheria have developed among the nurses since Dec. 1, 1927. Table 2 shows that before the Dick test and the preventive injection of toxin the percentage of scarlet fever among the nurses (516) was 7.7; that of 309 nurses who began their work as originally insusceptible (Dick negative), no one came down with scarlet fever; that of 200 susceptibles (Dick positive) immunized to Dick negative before going on duty, no one developed scarlet fever; and that of the 614 nurses taken into service since the Dick test came in use, 3, or 0.50 per cent, had scarlet fever. Again it is noteworthy that no cases of scarlet fever have developed in the nurses since Dec. 1, 1927.

TABLE 1.—*Diphtheria in Student Nurses in the Durand Hospital*

	Number of Nurses	Cases of Diphtheria	
		Number	Per Cent
Before Schick test (March 12, 1913, to Oct. 1, 1914)	38	7	18.4
After Schick test (Oct. 1, 1914, to Dec. 31, 1930)			
Originally insusceptible	157	6	3.8
Susceptibles given antitoxin	125	9	7.2
Susceptibles not given antitoxin	8	2	25.0
Total for period	290	17	5.8
After toxin-antitoxin or toxoid (Jan. 1, 1921, to Jan. 28, 1933)			
Originally insusceptible	102	6	6.0
Susceptibles immunized before service	267	1	0.36
Susceptibles immunized while on service	142	4	2.81
Susceptibles given antitoxin on entering service	36	1	2.8
Service incomplete, doubtful tests, and so on	45	1	2.2
Total for period	802	7	0.89
All told	1,130		

TABLE 2.—*Scarlet Fever in Student Nurses in the Durand Hospital*

	Number of Nurses	Cases of Scarlet Fever	
		Number	Per Cent
Before Dick test (March 12, 1913, to Dec. 31, 1923)	516	40	7.7
After Dick test (Jan. 1, 1924, to Jan. 28, 1933)			
Originally insusceptible	309	0	
Susceptibles immunized before service	200	0	
Susceptibles immunized while on service	89	2	2.24
Not tested, susceptible but not immunized, and so on	16	1	6.2
Total for period	614	3	0.50
All told	1,130		

Further, that susceptible young women immunized to negative Schick and Dick tests before assuming the active nursing of diphtheria and scarlet fever patients are also well protected.[2] As stated in the former report,[1] "by means of Schick and Dick tests followed, when necessary, with active immunization, nurses can be selected who are practically free from the danger of diphtheria and scarlet fever."

637 South Wood Street.

2. These results are corroborated by the work of Rhoads on the prevention of diphtheria and scarlet fever in the nurses in the Cook County Hospital, Chicago (Rhoads, P. S.: Skin Tests and Immunization Against Scarlet Fever and Diphtheria, J. A. M. A. **97**: 153 [July 18] 1931).

Council on Physical Therapy

THE COUNCIL ON PHYSICAL THERAPY OF THE AMERICAN MEDICAL ASSOCIATION HAS AUTHORIZED PUBLICATION OF THE FOLLOWING REPORT.
H. A. CARTER, Secretary.

ACCEPTANCE OF SUNLAMPS

During the past seven years the Council on Physical Therapy has devoted much time and effort to the question of ultraviolet radiation therapy, and in two preliminary statements[1] gave its conclusions and its specifications for acceptance of "sunlamps," by which term is understood a lamp that, at a specified distance, emits ultraviolet radiation not differing essentially from that of the clearest weather, midday, midsummer, midlatitude, sea level, natural sunlight, in total intensity and in spectral range of wavelengths extending from about 2,900 to and including 3,130 angstroms and that does not emit an appreciable amount of ultraviolet radiation of wavelengths shorter than 2,800 angstroms.

Sunlamps, so called, are not to be confused with therapeutic ultraviolet generators designed for service in hospitals, clinics and offices of physicians. Since sunlamps are for unsupervised home use, they are often of low intensity to avoid injury from overdosage.

After extensive investigation and inquiry, in collaboration with physicists and other scientists acting as consultants, and after due consideration of the status of ultraviolet radiation therapy, the Council on Physical Therapy has adopted, and, until a more practicable and reliable procedure is proposed, will use the erythemal reaction as a basis for judging the effectiveness of a sunlamp, for the following reasons:

(*a*) The erythemic response is in common use as an indicator of skin tolerance and of the amount of ultraviolet radiation that can be applied at one time; and so long as the present-day types of ultraviolet generators are used, the erythemic test will be necessary to prevent injury from burns.

(*b*) It is practically the only physiologic reaction to ultraviolet rays that is established with a relatively high degree of accuracy, permitting a calculation of the approximate time of exposure from a simple physical measurement of the ultraviolet radiant flux emitted by the lamp.

(*c*) It is a simple and practicable means of preventing severe burns when using powerful sources of ultraviolet radiation.

(*d*) It is an efficient safeguard against the fraudulent sale of lamps that emit little or no radiation of wavelengths shorter than about 3,130 angstroms, generally accepted as having a specific therapeutic value in preventing rickets.

In an adopted article entitled "Ultraviolet Radiation Useful for Therapeutic Purposes—Specification of Minimum Intensity or Radiant Flux," by Dr. W. W. Coblentz, the Council has definitely specified the types of ultraviolet radiation generators that possess sufficient ultraviolet energy to be of therapeutic value. Furthermore, the Council has drafted two lists of requirements to govern advertising of ultraviolet generators to the public and to the profession.[2]

The Council's specifications of minimum intensity are based on a comfortable and convenient operating distance (namely, 24 inches, or 61 cm.) from the front edge of the reflector, at which distance the exposure can be made without burning the skin. The ultraviolet intensity of the lamp shall be such that the time of exposure to obtain a minimum perceptible erythema (if such a dose is desired) is sixty minutes, or a total of 120 minutes for a complete exposure front and back. In this connection it is relevant to note that the Council does not prescribe the dosage of ultraviolet radiation. Its function is to advise and protect the medical profession and the public against misleading and deceptive advertising in connection with the manufacture and sale of devices for use in physical therapy.

1. Acceptance of Sunlamps: A Preliminary Statement, J. A. M. A. **99**: 31 (July 2) 1932, **100**: 1863 (June) 1933. The present specifications for acceptance of sunlamps supersede the earlier statements on this subject.

2. Regulations to Govern Advertising of Ultraviolet Generators to the Medical Profession Only, and Regulations to Govern Advertising of Ultraviolet Generators to the Public Only, J. A. M. A. **98**: 400 (Jan. 30) 1932.

In view of the increasing number of so-called sunlamps, some emitting so little ultraviolet that from ten to twenty hours would be required to obtain an erythemal dose, the purchaser of a sunlamp has a right to expect, and the Council on Physical Therapy requires the ultraviolet output to be sufficiently strong, relative to the total heat emanating from the lamp, that, if an erythemal dose is desired in fifteen minutes, the operating distance can be shortened without burning the bare skin by the heat ("heat burn") of the lamp in its reflector.

Physiologic experiments show that for practical purposes the wavelength of maximum erythemogenic action may be taken at the emission line of homogeneous radiation of mercury vapor, at 2,967 angstroms, present in many sources of ultraviolet radiation. The erythemogenic efficiency of this emission line is practically 100 per cent. No other wavelength or group of wavelengths, in any source, has such a high efficiency in generating an erythema.

For example, the erythemogenic efficiency (these values are subject to slight revision when better known) of the ultraviolet of wavelengths shorter than and including 3,130 angstroms, in sea level, midlatitude, noonday June sunlight, is about 0.22 (22 per cent); the Mazda type S-1 Lamp, 0.24; the Mazda type S-2 lamp, 0.215; the low temperature, type G, mercury vapor glow lamp, 0.185; the so-called cold quartz, low temperature, low vapor pressure, mercury arc, 0.55; the high temperature, high vapor pressure, quartz mercury arc, 0.344; the high frequency, electrodeless discharge, quartz mercury arc, 0.33; the blue flame carbon arc lamp, 0.42; and the Mazda CX tungsten filament lamp, from 0.16 to 0.20, depending on the temperature of the filament.

The intensity and the erythemogenic action of the emission line of mercury at 2,967 angstroms is easily evaluated in absolute units; and the erythemogenic action, as well as the radiometric output, of heterogeneous ultraviolet radiation from various sources is easily correlated with this emission line as a standard.

The Council has therefore adopted 10 microwatts per square centimeter of homogeneous radiation of wavelength 2,967 angstroms as the unit of intensity of erythemal flux, and has (tentatively) called it the Finsen unit [2] (F. U.); that is, 1 F. U. = 10 microwatts per square centimeter of wavelength 2,967 angstroms. On the basis of the Council's specification of an exposure of fifteen minutes, it will require 20 microwatts per square centimeter (2 F. U.) of homogeneous radiation of wavelength 2,967 angstroms to produce a minimum perceptible erythema. The amount of ultraviolet radiation of wavelengths shorter than and including 3,130 angstroms that a source must emit, equivalent to 20 microwatts per square centimeter of homogeneous radiation of wavelength 2,967 angstroms, is obtained by dividing the 20 microwatts by the erythemogenic efficiency of the source in question. For example, the erythemogenic equivalent of standard sunlight is $(20 \div 0.22 =)$ 91 microwatts per square centimeter, and for the type G mercury vapor glow lamp it is $(20 \div 0.185 =)$ 108 microwatts per square centimeter.

The erythemogenic efficiency of a source is obtained by the method employed at the Bureau of Standards,[4] using the revised spectral erythemic response curve of the average untanned skin.[5]

From the foregoing specifications, it follows that in order to produce a minimum perceptible erythema on the average skin, in fifteen minutes for therapeutic lamps and in sixty minutes for so-called sunlamps, the erythemogenic equivalent of the heterogeneous ultraviolet radiant flux of wavelengths shorter than and including 3,130 angstroms, emitted by the various sources mentioned shall not be less than the values given in the accompanying table (Erythemal Unit, E. U.).

The specification of minimum acceptable intensities given in the table are average values observed in a 0-5° zone subtended by the center of the source (burning at an angle, if so used in practice); i. e., within a circle approximately 4 inches (10 cm.) in diameter, lying in a plane at right angles to the axis of the reflector, at the specified operating distance.

To avoid burns, the irradiated area shall be free from "hot spots," having an intensity greater than two times the average value measured in the central 0-5° zone, free from "hot spots."

At no point within a circle about 18 inches (45 cm.) in diameter, at a distance of 24 inches (61 cm.) from the front edge of the reflector (more specifically, in a 0-20° zone, subtended by the center of the source and lying in a plane at right angles to the axis of the reflector) shall the intensity be less than one-third the average value observed in the central 0-5° zone. Since a circle 45 cm. in diameter contains about 1,600 cm.^{2} (if it were uniformly irradiated with 1 F. U. per square centimeter), the total erythemal flux would amount to about 16,000 microwatts. In practice, this area cannot be irradiated uniformly; hence it is necessary to take this fact into consideration.

The correlation of erythemogenic equivalents of the various lamps, given in the table, is to be used in the following manner: Suppose, for example, that a type G mercury vapor glow lamp is submitted to the Council for acceptance and that the radiometric measurements at 24 inches (61 cm.) indicate an ultraviolet radiant flux of 9 microwatts per square centimeter. Since this is only $(9 \div 27 =)$ one third of the minimum requirement for this type of sunlamp, it will be necessary to prolong the exposure for $(3 \times 60 =)$ 180 minutes (3 hours) if it is desired to obtain an erythemal dose with the lamp at 24 inches. Obviously, such a lamp does not comply with the Council's specifications.

Minimum Acceptable Intensities

1 E. U.	=	20 microwatts per sq.cm. of homogeneous radiation of wavelength 2,967 angstroms; exposure, 15 minutes.
	=	5 microwatts per sq.cm. of homogeneous radiation of wavelength 2,967 angstroms; exposure, 60 minutes.
	=	91 microwatts per sq.cm. of midday, midsummer, midlatitude, sea level ultraviolet solar radiation; exposure, 15 minutes.
	=	23 microwatts per sq.cm. of midday, midsummer, midlatitude, sea level ultraviolet solar radiation; exposure, 60 minutes.
	=	83 microwatts per sq.cm. of Mazda type S-1 lamp radiation; exposure, 15 minutes.
	=	21 microwatts per sq.cm. of Mazda type S-1 lamp radiation; exposure, 60 minutes.
	=	93 microwatts per sq.cm. of Mazda type S-2 lamp radiation; exposure, 15 minutes.
	=	23 microwatts per sq.cm. of Mazda type S-2 lamp radiation; exposure, 60 minutes.
	=	108 microwatts per sq.cm. of low temperature, type G, mercury vapor glow lamp radiation; exposure, 15 minutes.
	=	27 microwatts per sq.cm. of low temperature, type G, mercury vapor glow lamp radiation; exposure, 60 minutes.
	=	58 microwatts per sq.cm. of high temperature, high vapor pressure, quartz mercury arc radiation; exposure, 15 minutes.
	=	14.5 microwatts per sq.cm. of high temperature, high vapor pressure, quartz mercury arc radiation; exposure, 60 minutes.
	=	60 microwatts per sq.cm. of high frequency, electrodeless discharge, mercury arc radiation in a quartz bulb; exposure, 15 minutes.
	=	15 microwatts per sq.cm. of high frequency electrodeless discharge, mercury arc radiation in a quartz bulb; exposure, 60 minutes.
	=	36 microwatts per sq.cm. of "cold quartz" low temperature, low vapor pressure, quartz mercury arc radiation; exposure, 15 minutes.
	=	9 microwatts per sq.cm. of "cold quartz" low temperature, low vapor pressure, quartz mercury arc radiation; exposure, 60 minutes.
	=	48 microwatts per sq.cm. of blue flame carbon arc lamp radiation (in reflector, no filter window); exposure, 15 minutes.
	=	12 microwatts per sq.cm. of blue flame carbon arc lamp radiation (in reflector, no filter window); exposure, 60 minutes.

In the low temperature glow lamps, which have a low infrared output, it may not be found objectionable to shorten the operating distance in order to shorten the time of exposure. On the other hand, in the case of the tungsten filament lamp, the large amount of heat from the filament and from the glass bulb may become intolerable when the lamp is operated close to the body.

From time to time, acceptances or rejections of sunlamps for home use will be published in the columns of the Council on Physical Therapy in THE JOURNAL. In accepting sunlamps, the attention of the profession is called to the following:

A. The Council on Physical Therapy definitely withholds acceptance of the postulatory principle of dual-purpose lighting,

3. Coblentz, W. W.: Ultraviolet Radiation Useful for Therapeutic Purposes, J. A. M. A. **98**: 1082 (March 26), **99**: 125 (July 9) 1932. Luckiesh, M., and Holladay, L. L.: Fundamental Units and Terms for Biologically Effective Radiation, J. Opt. Soc. America **23**: 197 (June) 1933.

4. Coblentz, W. W.; Stair, R., and Hogue, J. M.: Bur. Stds. J. Research **8**: 770 (June) 1932; Res. Paper 450, obtainable only from the Supt. of Documents, Washington, D. C., price 5 cts.

5. Coblentz, W. W.; Stair, R., and Hogue, J. M.: Bur. Stds. J. Research **8**: 541 (April) 1932; Res. Paper 433, price 5 cts.; revised data in Res. Paper 631, January, 1934.

because it is highly theoretical and the promulgators of this idea have not presented acceptable clinical evidence to the Council substantiating its therapeutic or prophylactic value.

B. The Council on Physical Therapy declines to accept sunlamps if the manufacturer fails to state in all advertising matter and descriptive literature the distance between the lamp and the recipient required to equal the intensity of midday, midsummer, midlatitude, sea level, natural sunlight. Thus, in the acceptances that follow, the reader will note that the manufacturer has stated the distance the recipient should be from the sunlamp to receive the alleged benefits.

C. The manufacturers of acceptable sunlamps for home use have agreed to discontinue objectionable claims, such as that exposure to ultraviolet rays increases or improves the tone of the tissues or of the body as a whole, stimulates metabolism, acts as a tonic, increases mental activity, maintains health or tends to prevent colds, because these claims have not been conclusively substantiated by experimental evidence.

D. The Council declines to sanction claims recorded in descriptive literature and advertising matter in which implication is made that the production of an erythema is unnecessary as a test of intensity; that suberythemal doses are sufficient for therapeutic benefit. The Council believes that, while such statements may be made in good faith, they merely open the way to fraud by irresponsible venders of alleged sources of ultraviolet radiation. Until further evidence is presented to prove otherwise, the Council declares that the erythema test is the only means of determining whether appreciable ultraviolet is emitted by the source.

In order that there can be no misunderstanding on the part of any one relative to the stand of the Council on Physical Therapy on the acceptance of sunlamps, the dual-purpose lighting and the suberythemal dosage, the aforementioned stipulations are given to the profession that it may better understand the problems confronting the Council regarding ultraviolet radiation therapy. The Council will give careful consideration to clinical evidence scientifically gathered by controlled experiments.

Council on Pharmacy and Chemistry

NEW AND NONOFFICIAL REMEDIES

THE FOLLOWING ADDITIONAL ARTICLES HAVE BEEN ACCEPTED AS CONFORMING TO THE RULES OF THE COUNCIL ON PHARMACY AND CHEMISTRY OF THE AMERICAN MEDICAL ASSOCIATION FOR ADMISSION TO NEW AND NONOFFICIAL REMEDIES. A COPY OF THE RULES ON WHICH THE COUNCIL BASES ITS ACTION WILL BE SENT ON APPLICATION.

PAUL NICHOLAS LEECH, Secretary.

ANTIMENINGOCOCCUS SERUM (See New and Nonofficial Remedies, 1933, p. 367).

Mulford Biological Laboratories, Sharp & Dohme, Philadelphia and Baltimore.

Antimeningococcic Serum (See New and Nonofficial Remedies, 1933, p. 368).

Also marketed in one syringe containing 30 cc., with intraspinal and intravenous injection outfit.

SODIUM AMYTAL (See New and Nonofficial Remedies, 1933, p. 99).

The following dosage forms have been accepted:

Ampoule Sodium Amytal, 0.125 Gm. (1¾ grains).
Pulvules Sodium Amytal, 1 grain.

MEAD'S HALIBUT LIVER OIL WITH VIOSTEROL 250 D (THE JOURNAL, Nov. 18, 1933, p. 1634).

The following dosage form has been accepted:

Mead's Viosterol in Halibut Liver Oil 250 D (In Capsules): Each capsule contains 3 minims of Mead's viosterol in halibut liver oil 250 D, representing a vitamin potency of not less than 5,500 units of vitamin A (U. S. P. X) and 570 units of vitamin D (Steenbock).

LUMINAL-SODIUM (See New and Nonofficial Remedies, 1933, p. 90).

The following dosage form has been accepted:

Ampules Luminal Sodium Solution in Ethylene Glycol, 2 cc.: Each cubic centimeter contains luminal sodium 2.5 grains, dissolved in ethylene glycol. The solution may be administered intramuscularly or subcutaneously but not intravenously.

PRELIMINARY REPORTS OF THE COUNCIL

THE COUNCIL HAS AUTHORIZED PUBLICATION OF THE FOLLOWING PRELIMINARY REPORT.

PAUL NICHOLAS LEECH, Secretary.

VINYL ETHER

Vinyl ether (divinyl ether, divinyl oxide) is a preparation of Merck & Company, Inc., originally proposed by Leake and Chen[1] for use in inhalation anesthesia in place of ethyl ether and subsequently studied by Leake and his co-workers,[2] by Gelfan and Bell,[3] and by Goldschmidt, Ravdin, Lucke, Muller, Johnston and Ruigh,[4] whose paper appears in this issue.

At the request of the Council on Scientific Assembly, the Council considered the available evidence as to the therapeutic usefulness of vinyl ether previous to the annual session of the American Medical Association in order that Dr. Ravdin and his associates might present their observations at a section of the assembly at Milwaukee. The Council authorized publication of the following report:

Vinyl ether ($CH_2{=}CH.O.CH{=}CH_2$) was prepared in pure form by Ruigh and Major[5] of the Merck Laboratory of Pure Research, in 1930. It is a highly volatile liquid (boiling point 28.3 C.), having a peculiar sweetish ethereal odor somewhat reminiscent of that of ethylene ($CH_2{=}CH_2$), to which substance it is closely related chemically; it is more inflammable than ether and is relatively unstable in the chemically pure state, forming resin-like polymers, and decomposing with the development of formaldehyde and formic acid, in the presence of light and air; it is readily decomposed by traces of acid.

Vinyl ether, as prepared for anesthesia, is said to contain 0.01 per cent phenyl-alpha-naphthylamine to prevent polymerization and decomposition, and 3.5 per cent absolute ethyl alcohol to prevent freezing on evaporation. This product is not yet marketed for general use and is prepared at present only for investigative work.

The advantages claimed for vinyl ether over ethyl ether are that it is less irritating to mucous membranes; that induction of anesthesia is much more rapid and recovery much more prompt, resembling ethylene in the latter respects; that it has a somewhat higher partition coefficient than ethyl ether; that the minimum anesthetic concentration is much lower; that the minimum blood concentration of vinyl ether necessary for anesthesia is about one-fourth that of ethyl ether; that vinyl ether offers a greater margin of safety.

According to Goldschmidt and his co-workers, in normal dogs the critical period for the production of liver necrosis appears to lie between two and three hours of anesthesia with vinyl ether. In a series of monkeys two three-hour periods, and in one case a six-hour period of anesthesia did not result in liver necrosis.

Clinically, vinyl ether has been used for short periods in three individuals by Gelfan and Bell, and in 428 patients in the series of Goldschmidt et al. Induction is said to be exceedingly rapid and recovery correspondingly prompt, the latter occurring frequently in from thirty seconds to one minute. Satisfactory surgical relaxation is stated to obtain and anesthesia has been maintained for varying periods up to nearly three hours. Postoperative emesis is said to have occurred in 12.8 per cent of the patients in the series of Goldschmidt and his collaborators. No evidence of injury to the liver or kidneys was seen in any case in that series.

The Council decided to defer further consideration of Vinyl Ether for Anesthesia pending accumulation of additional evidence as to the therapeutic usefulness of this product and until the manufacturer markets vinyl ether for general use; at that time the preparation will also be examined by the A. M. A. Chemical Laboratory.

1. Leake, C. D., and Chen, M.Y.: Proc. Soc. Exper. Biol. & Med. **28**: 151 (Nov.) 1930; Anesth. & Analg. **10**: 1 (Jan.-Feb.) 1931.
2. Knoefel, P. K.; Guedel, A. E., and Leake, C. D.: Proc. Soc. Exper. Biol. & Med. **29**: 139 (Nov.) 1931. Leake, Knoefel and Guedel: J. Pharmacol. & Exper. Therap. **47**: 5 (Jan.) 1933.
3. Gelfan, S., and Bell, I. R.: J. Pharmacol. & Exper. Therap. **47**: 1 (Jan.) 1933.
4. Goldschmidt, Samuel; Ravdin, I. S.; Lucke, Baldwin; Muller, G. P.; Johnston, C. G., and Ruigh, W. L.: Divinyl Ether, this issue, p. 21.
5. Ruigh, W. L., and Major, R. T.: J. Am. Chem. Soc. **53**: 2662 (July) 1931.

Committee on Foods

ACCEPTED FOODS

THE FOLLOWING PRODUCTS HAVE BEEN ACCEPTED BY THE COMMITTEE ON FOODS OF THE AMERICAN MEDICAL ASSOCIATION FOLLOWING ANY NECESSARY CORRECTIONS OF THE LABELS AND ADVERTISING TO CONFORM TO THE RULES AND REGULATIONS. THESE PRODUCTS ARE APPROVED FOR ADVERTISING IN THE PUBLICATIONS OF THE AMERICAN MEDICAL ASSOCIATION, AND FOR GENERAL PROMULGATION TO THE PUBLIC. THEY WILL BE INCLUDED IN THE BOOK OF ACCEPTED FOODS TO BE PUBLISHED BY THE AMERICAN MEDICAL ASSOCIATION.

RAYMOND HERTWIG, Secretary.

CARTOSE. A CARBOHYDRATE SYRUP FOR INFANT FEEDING

Distributor.—Scientific Sugars Company, Indianapolis.

Manufacturer.—Union Starch and Refining Company, Granite City, Ill.

Description.—Syrup consisting essentially of maltose, dextrins, dextrose and sucrose.

Manufacture.—Glucose or corn syrup (90 parts) prepared as described for Pennant Crystal White Syrup (THE JOURNAL, Jan. 30, 1932, p. 402) and light brown sugar (10 parts) are mixed in a glass lined autoclave and adjusted to 75 per cent solids content. The mixture is raised to a temperature of 121 C., cooled to 82 C. and filtered through 100 mesh cloth into glass bottles in a room supplied with filtered air. The bottles are capped in a steam chamber.

Analysis (submitted by manufacturer).—

	per cent
Moisture	25.
Ash	0.4
Protein (N × 6.25)	0.1
Sucrose	7.0
Reducing sugars as invert sugar	0.5
*Maltose	30.
*Dextrose	12.
*Dextrins	25.

(The analysis is calculated from separate analyses of the ingredients corn syrup and brown sugar.)

*Fetzer, Evans and Longenecker, *Indust. & Engin. Chem.*, anal. ed. 5:81, 1933.

Calories.—3.0 per gram; 85 per ounce; 123 per fluidounce.

Claims of Manufacturer.—A carbohydrate syrup recommended as a carbohydrate supplement for milk modification in infant feeding. The method of preparation and packing assure absence of pathogenic organisms.

CAPITOL BRAND EVAPORATED MILK

Packer.—John F. Jelke Company, Hillsboro, Wis.

Description.—Canned unsweetened sterilized evaporated milk, the same as Jelke Good Luck Evaporated Milk Unsweetened, Sterilized (THE JOURNAL, July 29, 1933, p. 367).

BEECH-NUT STRAINED PRUNES

Manufacturer.—Beech-Nut Packing Company, Canajoharie, N. Y.

Description.—Sieved prunes retaining in high degree the natural vitamin and mineral values.

Manufacture.—California prunes are soaked over night, washed, allowed to simmer in open kettles with a small amount of water for one hour, pitted, strained, and subsequently treated as described for Beech-Nut Strained Carrots (THE JOURNAL, Nov. 11, 1933, p. 1562). The jars are processed at 100 C. for thirty minutes.

Analysis (submitted by manufacturer).—

	per cent
Moisture	69.5
Total solids	30.5
Ash	0.7
Fat (ether extract)	0.2
Protein (N × 6.25)	0.1
Reducing sugar as invert sugar	20.9
Sucrose (copper reduction method)	0.0
Crude fiber	0.6
Carbohydrates other than crude fiber (by difference)	28.9

Calories.—1.2 per gram; 34 per ounce.

Vitamins and Claims of Manufacturer.—See these sections for Beech-Nut Strained Carrots (THE JOURNAL, Nov. 11, 1933, p. 1562).

IRRADIATED VITAMIN D PASTEURIZED MILK

Distributor.—Gridley Dairy Company, Inc., Milwaukee (subsidiary of The Borden Company, New York).

Description.—Bottled pasteurized vitamin D milk irradiated by Steenbock process (patent No. 1,680,818).

Preparation.—Milk is irradiated by a "CP Carbon Arc Lamp Milk Irradiator" equipped with recording meters for measuring lamp energy input, output of milk pump, and ultraviolet ray emanations of the arc lamps, which provide complete charts of operation for inspection by plant and health officials. The irradiated milk is pasteurized by standard procedure (holding method, thirty minutes at 63 C.), immediately cooled, automatically bottled and capped.

Vitamins.—Clinical investigation shows this irradiated milk to be a reliable antirachitic agent protecting practically all infants excepting those prematurely born; contains 50 Steenbock vitamin D units per quart.

Claims of Distributor.—Irradiated antirachitic pasteurized milk having otherwise the natural flavor and food values of usual pasteurized milk. Complies with the requirements of the state of Wisconsin and the health department of the city of Milwaukee. The method of irradiation and the equipment are under scientific control.

COLLEGE INN TOMATO JUICE COCKTAIL

Distributor.—College Inn Food Products Company, Chicago.

Packer.—Welch Grape Juice Company, North East, Pa.

Description.—Tomato juice cocktail containing tomato juice, Worcestershire sauce and salt; retaining in high degree the vitamin content of tomatoes.

Manufacture.—Essentially the same as for College Inn Pure Tomato Juice (THE JOURNAL, Dec. 23, 1933, p. 2051) with the exception that Worcestershire sauce is added and the final processing of the jars is for twenty minutes at 82 C.

Analysis (submitted by manufacturer).—

	per cent
Moisture	91.7
Total solids	8.3
Ash	1.4
Sodium chloride	1.0
Fat (ether extract)	0.0
Protein (N × 6.25)	0.6
Reducing sugars as invert sugar	4.1
Crude fiber	0.2
Carbohydrates other than crude fiber (by difference)	5.6
Titratable acidity as citric acid	0.5

Calories.—0.3 per gram; 8 per ounce.

Vitamins and Claims of Manufacturer.—See these sections for College Inn Pure Tomato Juice (THE JOURNAL, Dec. 23, 1933, p. 2051).

ANITA HIGH PROTEIN FLOUR
(BLEACHED AND UNBLEACHED)

ESTRELLA FLOUR
(BLEACHED AND UNBLEACHED)

Manufacturer.—Texas Star Flour Mills, Galveston, Texas.

Description.—Hard red winter wheat "straight" flour: bleached and unbleached.

Manufacture.—Selected hard red winter wheat is cleaned, scoured, tempered and milled by essentially the same procedure as described in THE JOURNAL, June 18, 1932, page 2210. All flour streams are blended and are bleached with nitrogen trichloride (one-ninth ounce per 196 pounds) and with a mixture of calcium phosphate and benzoyl peroxide (1 part to 50,000 parts of flour).

Claims of Manufacturer.—For general baking.

I. G. A. CRYSTAL TABLE SYRUP
(CORN SYRUP FLAVORED WITH CANE SUGAR SYRUP)

Packer.—Wheeler-Barnes Company, Minneapolis.

Distributor.—Independent Grocers Alliance Distributing Company, Chicago.

Description.—Table syrup; corn syrup base (85 per cent) with cane sugar syrup (15 per cent), the same as White Oak Brand Crystal White Syrup (THE JOURNAL, Oct. 15, 1932, p. 1353).

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SATURDAY, JANUARY 6, 1934

MORE CRYSTALLINE ENZYMES

Biology and medicine have been interested for a century in the existence of substances that possess the unique property of biochemical catalysts. Recently, reference was made [1] to the centenary of the introduction of the word "diastase" by Payen and Persoz to represent the constituent of barley malt that converts starch into sugar, just as strong acids do, although no living cells are present. Until recently the French writers have in fact called all enzymes "diastases," though this word has been all but abandoned in the English literature of biochemistry. During the past hundred years many biochemical catalysts, sometimes designated as "unorganized ferments" and more commonly as "enzymes," have been described. They abound in the digestive secretions, where they play an important part in alimentation. They occur in plant tissues and in micro-organisms.

The preparation of a substance in crystalline form is usually accepted as evidence that it has been obtained in a condition of relative purity. Recrystallization increases the degree of purity. To Prof. J. B. Sumner of Cornell University goes the credit of having first described, in 1926, the crystallization of an enzyme, urease, that promotes the conversion of urea to ammonia and carbon dioxide. Since then science has witnessed the description of crystalline pepsin, amylase and trypsin in this country. All these products have the properties of proteins. Some of the European biochemists have alleged that the crystalline proteins are not themselves the functional catalysts but are merely the "carriers" of the active groups. This implies, according to the view of Willstätter, that the intrinsic part of an enzyme is some specifically active radical anchored to a carrier which is characterized by high molecular weight but is not necessarily markedly specific in character. American investigators are inclined to debate this distinction.

The most recent contribution comes from the Rockefeller Institute for Medical Research in Princeton, N. J., through Kunitz and Northrop,[2] who already have achieved merit in the preparation of crystalline pepsin and trypsin. It has been known, through the classic studies of Kühne at Heidelberg and Heidenhain at Breslau, that the proteolytic enzymes of the pancreas are completely inactive in fresh pancreas or in freshly secreted pancreatic juice. The enzymes become active when mixed with the enterokinase of the small intestine, as found by Schepowalnikow, or when the pancreas is allowed to stand in slightly acid solution. According to Vernon, activation many also be brought about by small amounts of active trypsin. The mechanism of this activation has been the subject of controversy for many years. Kunitz and Northrop have now described the isolation from fresh pancreas of an active crystalline protein which is converted by minute amounts of trypsin into a powerful proteolytic enzyme. This enzyme also has been obtained in crystalline form. The inactive protein has been called chymotrypsinogen and the active protein chymotrypsin. The activity of this preparation is about one-third that of the previously described crystalline trypsin with respect to the digestion of hemoglobin or casein. It is much less active than trypsin in liquefaction of gelatin but much more active in clotting milk. It does not clot blood and contains no amylase or lipase activity. The digestion of casein is carried much further than by the crystalline trypsin. The enzyme is evidently quite distinct from the trypsin previously isolated and may represent the "pancreatic rennet" of Vernon. The chymotrypsinogen has been recrystallized ten times and shows constant optical activity and constant proteolytic activity after activation by trypsin. Kunitz and Northrop have reason to believe that these new preparations represent pure proteins and that the proteolytic activity is a property of the protein molecule. Another distinguished achievement of American research effort has thus become recorded.

1. The Centenary of the Discovery of Diastase, editorial, J. A. M. A. **101**: 1564 (Nov. 11) 1933.

2. Kunitz, M., and Northrop, J. H.: Isolation of a Crystalline Protein from Pancreas and Its Conversion into a New Crystalline Proteolytic Enzyme by Trypsin, Science **78**: 558 (Dec. 15) 1933.

NUTRITION IN NATIONAL EMERGENCIES

Regardless of whether the situation is due to pestilence, war or economic distress, through which many nations have been passing in recent months, the most pressing problem that is likely to confront governments in such critical times is that of an adequate food supply for all classes of society. The realization of this was awakened to an unprecedented degree during the World War. In 1917 Herbert Hoover, at that time United States food administrator, pointed out [1] that the great conflict had entered a phase in which food dominated the economics, strategy and statesmanship not only of the countries at war but of neutrals as well. The Allies were blockading Germany, and its population was living in an era of food control previously undreamed of.

1. Kellogg, V. L., and Taylor, A. E.: The Food Problem, New York, Macmillan Company, 1917, preface.

The adjacent neutrals were under many restraints and pressures to yield their food to either side and were striving with every resource to protect their vital supplies. The Germans were trying to starve the Allies by sinking their supplies at sea. All were desperately trying to maintain production and reduce consumption. In consequence, food problems in balancing vegetable and animal production, in imports, exports and price controls, in protein, fat and carbohydrate content, were all silhouetted against a background of destruction and tragedy.

Under such ominous conditions, some of the leading nutrition experts in each country were called on to offer suggestions that might help to meet desperate situations. One American enthusiast ventured the public statement that "ours is the splendid burden of feeding the world." Within recent years the irony of fate has brought to our nation the necessity of giving serious attention anew to the problems of national nutrition. An almost unprecedented trade depression with millions of unemployed and poorly paid workers has presented the threat of undernutrition and malnutrition among our citizens. Almost every state in the Union, in addition to various federal government agencies, has organized scientific and philanthropic forces to avert nutritional disasters. The outcome of some of these deliberations and activities has been reviewed in earlier issues of THE JOURNAL.[2] Such undertakings have done far more than to meet impending emergencies; they have helped to summarize and apply the prevailing knowledge of nutrition at a period when notable advances were being reported in this science. This is true particularly of the growing information about vitamins and essential inorganic components of the diet.

Some time ago the British Medical Association appointed a Committee on Nutrition, which has recently published its report.[3] There was said to be on the one hand a considerable body of opinion that malnutrition is not observable among the poor, and on the other hand that it exists to a considerable extent. The British committee was specifically instructed "to determine the minimum weekly expenditure on foodstuffs which must be incurred by families of varying size if health and working capacity are to be maintained, and to construct specimen diets."

As in all such cases, it became necessary first of all to define the nature of the various essential constituents of a diet that would fulfil the requirements, and, further, to agree on the quantities necessary at varying ages. The task is not an easy one, as the requisite food intake must be varied with the amount of physical labor involved and the number of children of different ages in the families to be supported, as well as the availability and comparative costs of different common foods. Allowance must also be made for wastage in their preparation and alimentary utilization. The British committee, after careful consideration, recommended the adoption of the figure 3,400 calories in the food as purchased as the unit requirement of the normal man of average stature, if health and working capacity are to be maintained. This is not regarded as a minimum figure, nor would the adoption of a bare subsistence standard fulfil the terms of reference of the committee, which specifically states that both health and working capacity are to be maintained. It, moreover, does allow a little latitude for individual variation.

It is interesting to compare this conclusion with the deliberations of the experts at work during the World War. The Interallied Scientific Food Commission, which met in Paris late in March, 1918, adopted the following resolution: "That the requirements of the average man of 70 kilograms body weight doing eight hours average physical work in a climate such as England's or France's is to be considered as 3,300 calories as purchased." It was decided that 3,000 available calories as ingested was the requirement of the average man, leaving a 10 per cent margin for domestic spoilage or waste.[4] In the provision of the "emergency" rations in this country in recent months, the tendency has been toward a limitation of the provision of energy to somewhat less than 3,000 calories a day for the average adult man. Fractional requirements for persons of varying size and age have repeatedly been published.

The British experts have taken a noteworthy stand with respect to the protein factor in nutrition. Thus, they state,

> It is now usual to differentiate the protein foodstuffs into two classes. Proteins from animal sources are designated as first-class proteins, whilst those of vegetable origin are relegated to the second class. The first-class proteins, besides possessing a higher nutritional value than second-class proteins, are more nearly completely absorbed by the body. Vegetable proteins are absorbed in varying proportions, which rarely exceed 80 per cent. There is a measure of agreement that from 10 to 15 per cent of the daily calories should be derived from protein, and 100 grams of protein per day will provide 12 per cent of the total daily calory supply of 3,400. . . . The Committee . . . agrees that 50 grams of first-class protein per day is sufficient to maintain the health and working capacity of the average man. The figure of 50 grams of first-class protein represents half the daily protein intake. The other half can be furnished from vegetable sources.

This conclusion will scarcely please the advocates of the exclusive vegetarian diet, though it will not affect those who practice the more common forms of lacto-vegetarianism.

The new report alleges that a common fault in the dietaries of young children is a shortage of first-class protein. It insists that the popular prejudice against giving meat and cheese to children of this age is not based on physiologic data. In Britain, as in this country, the general consensus on the value of milk as a food for young children is so strong that it should be included in every case in the diet of children in order

2. Food and Nutrition in the Depression Period, editorial, J. A. M. A. **98**: 50 (Jan. 2) 1932. Depression Death Rates, ibid. **99**: 1354 (Oct. 15) 1932. Malnutrition in Children, ibid. **101**: 1318 (Oct. 21) 1933.

3. Report of Committee on Nutrition, British Medical Association, Brit. M. J., Nov. 25, 1933, supplement.

4. Lusk, Graham: The Elements of the Science of Nutrition, ed. 4 reset, Philadelphia, W. B. Saunders Company, 1928.

to maintain health and normal growth. The American tendency would be, however, to exceed somewhat the guiding rule of 1 pint of milk a day for a child up to the age of 5, and of half a pint of milk from 5 years to 10. The usual stress is placed on the invariable inclusion of dairy produce, fruits and green vegetables in the family diet in order to ensure a sufficiency of food containing vitamins and mineral constituents. In view of rapidly changing purchasing values, it is almost futile to compare the proposed costs of adequate nutrition in times of stress. It is heartening, however, to find such general agreement among the English-speaking nations in respect to the fundamental food problems of their people.

Current Comment

BOVINE TUBERCULOSIS

Many years ago, extensive investigations in this country and abroad proved that the organism causing tuberculosis in cattle is capable of infecting human beings. Bovine tuberculosis rarely causes pulmonary tuberculosis in adults, but according to Park and Krumwiede,[1] the bovine bacillus causes about one tenth of the bone, joint and lymph node tuberculosis in adults and one fourth of this type of tuberculosis in children. In young children it is said to cause from 6½ to 10 per cent of the total fatalities from this disease. Tuberculosis in cattle is, beyond question, a menace to public health. How the infection in cattle reaches man is another problem that has been extensively studied, and it is agreed that the chief agent in transmitting the infection is cow's milk. The well known process of pasteurization, if properly done, will destroy the tubercle bacilli in milk. But pasteurization is not always properly done and it is not everywhere required to be done at all. Strange to say, there are interests that would prevent the further adoption of this method of insuring safe milk. In an industry so close to the public health, it would be highly desirable to reach the point of attainment at which all tuberculous cattle were removed from the dairy herds. Since 1917 the federal government has been aiming at just that in its cooperation with the different states in testing, condemning and slaughtering tuberculous cattle. It is extremely interesting to note the changes in the death rate of tuberculosis in man that have occurred in that period. H. R. Smith of the National Live Stock Exchange calls attention to figures compiled from data from the U. S. Bureau of Animal Industry and the Bureau of the Census. The human death rate from respiratory tuberculosis in the United States in 1918 was 128.6 per hundred thousand of population, but it has decreased every year since then and last year was 56.6, or less than half what it was in 1918. The number of cattle tuberculin tested under this program in the year ended June 30, 1932, was nearly thirteen and a half million. In this huge number, 1.9 per cent had a positive tuberculin test in contrast to 4.9 per cent in the cattle tested in 1918. As a matter of record, the aggregate number of cattle tested in all these years under this program has been 115,170,388, and among them 2,693,570 reactors were found. It cannot be claimed that the cooperative program of the government for the eradication of bovine tuberculosis alone has been responsible for the decline in the tuberculosis death rate, but it certainly is significant that during the eighteen years previous to 1918 the death rate of tuberculosis other than respiratory did not decline; in fact, the trend was slightly higher. This mortality rate in the United States in 1900 was 21.4 per hundred thousand of population. In 1917 it was 22.5 and through the intervening years at no time did it fall below the rate that prevailed in 1900. Various influences were at work from 1900 to 1917 to reduce the mortality rate of respiratory tuberculosis and they succeeded, but they did not reduce the mortality rate of other forms of tuberculosis. Since the government's campaign was instituted, however, the trend of the mortality rate of tuberculosis other than respiratory has been entirely different. The rate has been less for each succeeding year, and in 1932 it was 6.4. The removal of hundreds of thousands of tuberculous cattle from the herds that supply milk was coincidental with the great decline in the death rate from tuberculosis other than respiratory. It would seem to substantiate the work of investigators who found long ago that bovine tuberculosis was responsible for a great many cases of extrapulmonary tuberculosis in man.

1. Park, W. H., and Krumwiede, Charles: The Relative Importance of the Bovine and Human Types of Tubercle Bacilli in the Different Forms of Tuberculosis, J. M. Res. **27**: 109, 1912-1913.

ALBERT ABRAMS REDIVIVUS

In the department of THE JOURNAL devoted to reports by the Bureau of Investigation appears in this issue an account of an exceedingly impudent attempt to exploit anew the so-called electronic reactions of Abrams. One is inclined to remark that there are no new hokums; there are merely the old hokums introduced in a new way. Barnum knew that the will to believe is perennial; the technic of the magician need not vary; one merely diversifies the materia magica. The idea of special vibrations for different diseases can be found among the concepts of ancient centuries. But the engineer who would revive the Abrams doctrine has introduced new wrinkles, which must be the product of a training in engineering. The physician who scans the pictures of the Food and Remedy Test Set and the cow, so scientifically hitched, which the Bureau of Investigation provides for his delectation, will realize how a training in engineering can help a man who yearns for a medical career. The reason for this comment in association with the extraordinarily complete analysis by the Bureau of Investigation of the claims of Engineer F. C. Ellis lies in the concluding two paragraphs of the report. The Micro-Dynameter of Mr. Ellis has been exhibited at a meeting of the Inter-State Postgraduate Medical Assembly. A few of the physicians who derive their scientific pabulum through that organization have apparently invested in the device and thereafter been unable to find it of the scientific worthiness which at the time of investment it seemed to possess. Moreover, a

so-called medical periodical, *Clinical Medicine and Surgery*, has aided promotion of the device through its advertising columns; indeed, Mr. Ellis flaunts a letter from the editor of that publication, Dr. George B. Lake, in support of his contentions. It seemed, when the late but not too greatly lamented Abrams passed from our midst—from pneumonia before he even hitched himself up to a machine—that his cult would pass soon from the scene. Usually these thaumaturgies disappear within a few years of the magician who promotes them. Little has been heard of Abramsism since that time and many a medical scrap heap yields the coils and wires that once were the heart and soul of the Abrams box. Yet now like a spirit from beyond the sepulcher emerges the Micro-Dynameter of Mr. Ellis. And a medical organization and a medical periodical are available to help rap the tables and shake the tambourines to assist the materialization. The spirit of Barnum must be chuckling beyond the Styx, unless perhaps exhausted by its laughter when viewing the multitudes who visited the india rubber man and the stuffed whale at A Century of Progress Exposition.

CAPILLARY PERMEABILITY TO LIPIDS

Attention has recently been directed to the need for further investigation of the physiology of digestion and absorption.[1] These functions of the organism are preparatory to the actual metabolism of the foodstuffs which, once circulating in the blood stream, are still more or less distantly removed from the cells of the tissues. Although the manner of transport of sugar and amino-acids is fairly well established, the mode of passage of lipids through the capillary walls into the interstitial fluid has not been satisfactorily explained. Man and Peters[2] have recently reported studies designed to elucidate the permeability of the capillary walls to the lipids of the plasma. Serums of normal persons were analyzed for cholesterol, total fatty acids and phospholipids before and after the subjects stood absolutely still for half an hour. Under these conditions of increased hydrostatic pressure there ordinarily occurs a passage of protein-free fluid from the capillaries into the tissues. In the present experiments it was observed that the increased concentration of cholesterol paralleled that of serum protein, indicating that this lipid failed to pass out of the capillaries as did the protein. In most of the subjects studied, the same observation was made with the total fatty acids and phospholipids. On the other hand, analysis of ascitic, pericardial and pleural fluids indicated that the lipids and protein occurred there in proportional concentrations. It is plain that these observations, though important from certain points of view, yield no explanation of the manner in which lipids traverse the walls of the blood vessels. As the transport, storage and utilization of lipids involve the transfer of this group of substances into and out of the capillaries, there is presented here, as recognized by the Yale investigators, still another problem in the biochemistry of fats.

1. Mendel, L. B.: Science **78**: 317 (Oct. 13) 1933.
2. Man, E. B., and Peters, J. P.: J. Clin. Investigation **12**: 1031 (Nov.) 1933.

Association News

MEDICAL BROADCAST FOR THE WEEK

Talk over Network of the National Broadcasting Company

The American Medical Association broadcasts each Monday afternoon from 5 to 5:15 Eastern standard time (4 o'clock, central standard time). The subject for Monday, January 8, is "Looking 1934-ward." The speaker will be Dr. W. W. Bauer, director, Bureau of Health and Public Instruction, American Medical Association. Subjects and speakers for subsequent broadcasts will be announced weekly in THE JOURNAL.

Radio Talks from Station WBBM

The American Medical Association broadcasts on Tuesday and Thursday mornings from 8:55 to 9 o'clock, central standard time, over Station WBBM (770 kilocycles, or 389.4 meters).

The subjects for the week are as follows:

January 9. Fever.
January 11. Drinking Water at Public Schools.

There is also a fifteen minute talk sponsored by the Association on Saturday morning from 9:45 to 10 o'clock over Station WBBM.

The subject for the week is as follows:

January 13. Lister and the Development of Surgery.

Medical News

(PHYSICIANS WILL CONFER A FAVOR BY SENDING FOR THIS DEPARTMENT ITEMS OF NEWS OF MORE OR LESS GENERAL INTEREST; SUCH AS RELATE TO SOCIETY ACTIVITIES, NEW HOSPITALS, EDUCATION, PUBLIC HEALTH, ETC.)

CALIFORNIA

Polluted Clams.—A group of clam diggers who had previously been dropped from the state "clam diggers list" was recently arrested for handling polluted clams. They were given a suspended sentence of thirty days. The state department of health states that the conviction is an important advance in the better control of a clean clam supply in the San Francisco Bay region. The control is getting more difficult because of the increasing consumption of clams and the depletion of supply in beds that are clean.

New State Mental Hospital.—Ground was recently broken for the new state mental hospital near Camarillo, Ventura County. The site is about 4½ miles from the Pacific Ocean and includes 1,610 acres, 1,200 being arable. The institution will ultimately cost about $7,000,000 and house 6,000 patients, although funds now available will provide facilities for only about 800 patients. The plans are designed for the ultimate capacity, twenty-two wards to be devoted to each group of 2,000 patients. These three divisions will each have its own feeding, industrial and hospitalization units, administration quarters and apartments for officers. Patients will be housed in a connected group of one and two story ward units enclosing a large central court and twelve smaller courts. Spanish and Italian architecture will prevail. It is hoped to have the institution ready for the reception of patients, May 1.

Society News.—Dr. Henry Douglas Eaton, Los Angeles, was elected president of the Southern California Medical Association, November 4; Drs. Leslie H. Redelings, San Diego, and Francis B. Settle, Long Beach, vice presidents, and Robert W. Langley, Los Angeles, secretary.——Dr. Rodney A. Yoell, San Francisco, addressed the San Joaquin County Medical Society in Stockton, November 2, on medical economics.——Dr. Henry Chesley Bush, Livermore, conducted a clinic on tuberculosis before the Sonoma County Medical Society, recently.——Dr. Hugh Cabot, Rochester, Minn., discussed "The Management of Bilateral Renal Calculi" before the Los Angeles Surgical Society, December 18. Dr. Allen B. Kanavel, Chicago, addressed the society, December 8, on problems in traumatic surgery of the hand.——Dr. Albert H. Rowe, Oakland, addressed the Fresno County Medical Society, recently, on "The Challenge of Allergy in Medical Practice."——Dr. Wil-

liam Boyd, professor of pathology, University of Manitoba Faculty of Medicine, gave the Colver lectures of the College of Medical Evangelists, December 18-19. His subjects were "Bacterial Infections of the Heart" and "Tumors of the Neck."

Popular Medical Lectures.—The fifty-second course of popular medical lectures to be given by Stanford University School of Medicine will open January 12 and continue on alternate Friday evenings until March 23. The following speakers will participate:

Dr. Edmund W. Butler, January 12, Organization of Medical and Surgical Emergencies in San Francisco.
Dr. Ray Lyman Wilbur, January 26, Medicine in Community Service.
Agnes Fay Morgan, Ph.D., February 9, Relation of Diet to Health.
Mary C. Rixford, O. T. Reg., February 23, Occupational Therapy.
Dr. George S. Johnson, March 9, Rôle of Psychiatry in Preventive Medicine.
Joseph C. Hinsey, Ph.D., March 23, Contributions of Medical Science to Our Knowledge of Pain.

COLORADO

Physician Donates Athletic Field.—About 3¼ acres of land was presented to the board of regents of the University of Colorado, November 14, to be used as an athletic field for students and members of the faculty. The property, which adjoins the campus of the medical school and Colorado General Hospital, Denver, will be named in honor of the donor, Dr. Horace G. Wetherill, Monterey, Calif., who was professor of gynecology in the medical school for many years. Dr. Wetherill, who has retired from practice, was formerly president of the Denver County Medical Society, the Colorado State Medical Society and the Western Surgical Association.

CONNECTICUT

Break Up Narcotic Ring.—An illicit traffic in narcotics in Connecticut is believed to have been broken up by the arrest, November 9, of seven leaders of two narcotic rings, which have been dealing almost exclusively with the illegal transportation of diacetylmorphine (heroin). Drugs valued at nearly $30,000 were confiscated by the agents. Narcotics were supplied to adjacent states.

Scholarship Awarded.—Yale University School of Medicine, New Haven, has awarded the Perkins Scholarship to Miss Lena Halpern, third year student. The scholarship, founded in 1914 by the widow of George C. Perkins, is given annually to the student making the best record in scholarship in the basic subjects of the medical and biologic sciences. Miss Halpern led her class at Yale in this respect and she had the highest average grade in a group of 593 medical students from all sections of the country who took the National Board examinations, part one, last June. She obtained a bachelor's degree at Hunter College in 1926 and a master's degree from Columbia University in 1930.

GEORGIA

Mental Hygiene Clinic Discontinued.—A free clinic for mental hygiene, conducted by the city-county health unit of Macon and Bibb County, was discontinued, December 1, as a part of an economy program instituted by the state board of control, newspapers reported. The clinic has been in operation for twelve years and was under the supervision of Dr. Young H. Yarbrough, Milledgeville.

ILLINOIS

Sanitation Program to Prevent Typhoid.—With the objective of eliminating sources of typhoid, the state health department has announced a program of sanitation in the southern part of the state, where, in thirty-four counties, the prevalence of typhoid is twelve times higher than in the northern third. With only one seventh of the population, the southern third of Illinois has fully one half of the state's typhoid cases each year. Last year the sixty-eight counties of the state had fifty-eight deaths from the disease, while the thirty-four counties in the southern section accounted for sixty-nine. An engineer of the U. S. Public Health Service has been assigned to Illinois to assist the state department of health in planning, organizing and supervising the project.

Chicago

Sentenced for Holdup of Physician.—Judge Epstein sentenced Stanley Kaszulowski to serve from one year to life in prison, December 5, after he had been found guilty by a jury of robbery with a gun. The victim was Dr. Edward H. Warszewski, a member of the Chicago Medical Society. Kaszulowski was a member of the bandit gang that specialized in "fake calls" and the holdup of physicians. Three of his companions were sentenced to 100 years each in the penitentiary, August 14, after they pleaded guilty to the murder of Dr. Bernard F. Garnitz.

Dr. Craig to Lecture on Amebic Dysentery.—Dr. Charles F. Craig, director of the department of tropical medicine, Tulane University of Louisiana School of Medicine, New Orleans, will give the second Jessie Horton Koessler Lecture of the Institute of Medicine of Chicago, January 26. He will discuss amebic dysentery. Officers of the institute, named at the eighteenth annual meeting, December 13, are chairman of the board of governors, Dr. Ludvig Hektoen; president, Dr. Joseph L. Miller; vice president, Dr. Vernon C. David; secretary, Dr. George H. Coleman, and treasurer, Dr. John Favill.

Address by Dr. Copeland.—Dr. Royal S. Copeland, senator from New York, will address the Chicago Medical Society, January 17, on the Copeland bill. Dr. Arthur J. Cramp, director, Bureau of Investigation, American Medical Association, Chicago, will discuss the bill. Dr. Evarts A. Graham, Bixby professor of surgery, Washington University School of Medicine, St. Louis, will participate in a symposium on the gallbladder in general practice before the society, January 24, discussing the surgical aspect. Drs. George H. Coleman and Anton J. Carlson will consider internal medicine and physiology, respectively.

INDIANA

Society News.—Speakers before the Indianapolis Medical Society, December 19, were Drs. Millard H. Foster on "Sexual Theory of the Neuroses"; Howard B. Mettel, "Rôle of Allergy as Applied to General Medicine," and Bert E. Ellis, "Obstruction of the Larynx." Dr. Henry S. Leonard was elected president of the society, December 5.——At a meeting of the Gibson County Medical Society in Princeton, December 11, Drs. John L. Morris and Amos H. Rhodes, Princeton, spoke on pneumonia and eye infection, including corneal ulcer, respectively.——Drs. Everett E. Padgett, Indianapolis, and Samuel Kennedy, Shelbyville, discussed medical economics before the Henry County Medical Society in Lewisville, December 7.——Dr. William J. Butler, Grand Rapids, addressed the Elkhart County Medical Society, December 7, on "Acute and Chronic Gonorrhea."——The Noble County Medical Society was addressed in Kendallville, December 12, by Dr. Merlin H. Draper, Fort Wayne, on tuberculosis.——Dr. Ernest O. Nay, Terre Haute, talked on "The Relief of Prostatic Obstruction by the Electroscope" before the Vigo County Medical Society, December 12.

KENTUCKY

Personal.—Dr. Elijah H. Maggard, superintendent of Eastern State Hospital, Lexington, has been transferred to Central State Hospital, Lakeland, to succeed Dr. William A. Quinn. Dr. Edward Davenport succeeded Dr. Maggard.——Dr. George L. Thompson, Calhoun, health officer of McLean County, was elected chairman of the Green River Valley Public Health Association at its annual meeting in Hartford, November 9.——Dr. Theodore Sallee, Covington, has been appointed health officer of Covington to succeed Dr. James P. Riffe, who has been elected coroner of Kenton County.

Society News.—The Physicians' and Dentists' Bureau for credit information and collection of accounts has been formed in Ashland with the approval of the Boyd County Medical Association.——A joint meeting of the Harlan County Medical Society, the Cumberland Valley Medical Society and the Southeastern Kentucky Dental Society was held in Harlan, December 6. Among other speakers were Elmer C. Hume, D.D.S., Louisville, on traumatic surgery of the facial structures and Dr. Addie M. Lyon, Frankfort, eugenic sterilization.——Dr. Earnest R. Goodloe, Paducah, addressed the Greenup County Medical Society in November on intravenous medication.——Dr. Leroy U. Gardner, Saranac Lake, N. Y., addressed the Jefferson County Medical Society, Louisville, December 4, on pathology of pulmonary tuberculosis.

MAINE

Survey of Malnourished Children.—The Maine Medical Association is cooperating with the state department of health, the Maine Public Health Association and local agencies in a plan to investigate and report on malnutrition in children of the state. Since local conditions are a factor, the organization of the plan has been left to the county medical societies with recommendations that they confer with local health officials. Arrangements will be made with school authorities for the examinations.

Society News.—At a meeting of the Portland Medical Club, November 7, Dr. Henry W. Lamb discussed "Joint Tuberculosis."——Dr. Harry F. Friedman, Boston, conducted a clinic on cancer before the Oxford County Medical Association in Rumford, recently, and gave an address on the same subject.——The Penobscot County Medical Society was addressed in Bangor, November 21, by Dr. Elliott C. Cutler, Boston, on "Total Thyroidectomy in the Treatment of Heart Disease," and Dr. Channing Frothingham, Boston, discussed uremia; both physicians also conducted clinics.——At a meeting of the Piscataquis County Medical Society at Dover-Foxcroft, November 23, Dr. Adelbert B. Allen, Waterville, discussed diseases of the prostate.

MARYLAND

Dr. Wilmer to Retire as Director of Ophthalmologic Institute.—Dr. William H. Wilmer will retire as director of the Wilmer Institute of Ophthalmology at Johns Hopkins University School of Medicine, Baltimore, July 1, to comply with regulations providing that professors leave the faculty when they reach the age of 70. The Wilmer institute was inaugurated in 1925, following the completion of a $3,000,000 fund, the income of one third of which serves for the maintenance of the department. The income of the second million is used for the support of beds in the clinic for persons unable to pay, and the third million is devoted largely to the construction and equipment of the necessary buildings for housing the department. Dr. Wilmer has been director of the institute since its establishment, carrying a concurrent appointment as professor of ophthalmology. He served in a similar capacity at Georgetown University School of Medicine, Washington, D. C., from 1906 to 1925. Dr. Wilmer was born in Powhatan County, Va., in 1863. He graduated in medicine at the University of Virginia in 1885, taking graduate study at the New York Polyclinic and various hospitals of Europe. In 1889 he established practice in Washington, D. C. Georgetown University conferred the degree of doctor of laws on Dr. Wilmer in 1919, and Princeton the degree of doctor of science in 1926. Now a brigadier general of the medical reserve corps, Dr. Wilmer's service in the army was concluded in 1918 as a colonel. Until 1918, he was officer in charge of the army medical research laboratories, when he assumed a similar responsibility for the American Expeditionary Forces in France, for one year. He was awarded the Distinguished Service Medal in 1919. Dr. Wilmer has held official positions with several scientific societies and contributed to the literature on ophthalmology and medical aviation. He plans to continue with his private practice and writing.

MASSACHUSETTS

Society News.—Dr. Donald Gregg, Wellesley, was named president of the Massachusetts Society for Mental Hygiene, November 23, and Dr. Charles E. Thompson, Gardner, secretary. Speakers at the annual meeting of the society included Dr. Lawrence K. Lunt, Concord; Payson Smith, Ed.D., Boston; Dr. Henry B. Elkind, and Dr. Clarence M. Hincks, director, National Committee for Mental Hygiene, New York.

In Honor of Dr. Shattuck.—The name of Van Dyke Street, which adjoins Harvard University Medical School, has been changed to Shattuck Street in memory of Dr. Frederick C. Shattuck. The street is a private thoroughfare and the change of name was made by authority of the Harvard Corporation and neighboring hospitals. Dr. Shattuck graduated from Harvard College in 1868 and from the Harvard Medical School in 1873. He became associated with the teaching staff in 1879 and served as Jackson professor of clinical medicine from 1888 to 1912. Following his retirement, he was a member of the board of overseers from 1913 to 1919 and remained actively interested in the progress and development of the institution until his death in 1929.

MICHIGAN

State Society Night.—January 15 has been designated "State Society Night" by the Wayne County Medical Society, when the program will be presented by members of the council of the Michigan State Medical Society:

George L. LeFevre, Muskegon, president, State Society Objectives.
Richard R. Smith, Grand Rapids, president-elect, State Institutions.
Burton R. Corbus, Grand Rapids, chairman, Council Responsibilities.
Frederick C. Warnshuis, Grand Rapids, secretary, The State Society: Its Activities, Strength and Weakness.

An opportunity will also be presented to members of the county medical society to ask questions. Following this meeting, a social hour will be held in honor of two past presidents of the Wayne County Medical Society, Drs. Frank A. Kelly (1923-1924) and Henry A. Luce (1925-1926).

Society News.—The Detroit Obstetrical and Gynecological Society was addressed, December 5, by Drs. Harold A. Furlong, Pontiac, on "Repair of the Urethra Following Obstetrical Trauma" and Alexander M. Campbell, Grand Rapids, "Radiopaque Media in Gynecological and Obstetrical Diagnosis."——The Bay County Medical Society was addressed, November 8, by Dr. Henry K. Ransom, Ann Arbor, on "Surgical Diseases of the Female Breast."——Dr. Grover C. Penberthy, Detroit, addressed the Gratiot-Isabella-Clare County Medical Society in Alma, November 9, on osteomyelitis in children.——At a meeting of the West Side Medical Society, Detroit, December 7, proposed changes in medical practice were discussed by Mr. William J. Burns and Drs. Henry A. Luce and Edgar E. Poos.——A symposium on automobile injuries was presented before the Wayne County Medical Society, December 18, by Drs. Elisha S. Gurdjian, Alfred D. LaFerte, Harry W. Plaggemeyer, Harold K. Shawan and Claire L. Straith and Inspector Henry J. Garvin of the Detroit Police Department.——Dr. Myron William Clift, Flint, was elected president of the Michigan Association of Roentgenologists, November 24, succeeding Dr. Augustus W. Crane, Kalamazoo.

MINNESOTA

Society News.—Speakers before the Hennepin County Medical Society, December 13, included Leroy S. Palmer, Ph.D., of the University of Minnesota on "Clinical Nature of Vitamins and Their Distribution in Foods," and Drs. Charles B. Wright and Arthur A. Wohlrabe, on diets in treatment of ulcerative colitis and gallbladder disease, respectively.——Dr. Charles H. Mayo, Rochester, has been reelected president of the Minnesota Public Health Association.

Tuberculosis Program in Hennepin County.—To stimulate interest in the early diagnosis of tuberculosis, the Hennepin County Tuberculosis Association is furnishing to physicians of the county a tuberculin syringe and diluted old tuberculin in a sterile vial. This service includes delivery to the physicians in their offices of a fresh supply of diluted tuberculin once every two weeks. Complete instructions are also given for applying and reading the Mantoux test. The tuberculosis association plans to inaugurate an educational campaign for the public later, stressing the importance of the tuberculin test and the x-rays in early diagnosis.

MISSISSIPPI

Society News.—The Central Medical Society was addressed in November, among others, by Drs. M. A. Sanchez-Vigil, Managua, Nicaragua, on "Practice of Medicine in Nicaragua," and Frank H. Hagaman, Jackson, "Resection of Sympathetic Nerves for Relief of Pelvic Pain."——Dr. Irwin W. Barrett, Clarksdale, among others, addressed the Clarksdale and Six Counties Medical Society, November 8, on hay fever, and Dr. William H. Brandon, Clarksdale, sterility.——Speakers before the East Mississippi Medical Society, October 19, were Drs. Leonard Hart, Meridian, and James S. Speed, Memphis, Tenn., heart disorders and fractures of the elbow joint, respectively.——Dr. James B. McElroy, Memphis, Tenn., discussed the treatment of malaria, among other speakers, before the North Mississippi Medical Society in Oxford, October 25.

NEW JERSEY

Princeton Investigates the State Health Department.—In a recent investigation of the state government conducted by Princeton University at the direction of Governor Moore, a number of recommendations were made concerning the state health department. To increase the revenue of the department the survey suggested that charges be made for examinations to test qualifications of persons desiring employment in fields closely connected with public health and for licenses issued to establishments handling foodstuffs. It was recommended that bakeries, canneries and confectioneries be added to the list of such establishments, removing these from the jurisdiction of the department of labor. Other license fees suggested were from individual milk plants from which milk is imported into New Jersey. Regulation of health conditions among persons who work at home for factories was urged as a function of the health department rather than the department of labor; control would be centered in a bureau of homework industries, the cost of which would be distributed among the contractors distributing such work. Among internal changes recommended were restoration of the publication of *Public Health News*, the department's bulletin; combination of the bureau of venereal

disease with the bureau of local health administration, which handles problems concerned with other communicable diseases; restoration of appropriations to provide offices and help for district health officers, and abolishment of the health officer of the port of Perth Amboy.

NEW YORK

Society News.—The ninth annual meeting of the New York State Committee of the American Society for the Control of Cancer was held in Rochester, December 12. A clinical conference was held in the morning at Strong Memorial Hospital, Rochester, and in the evening Dr. Burton T. Simpson, chairman of the state committee, addressed a public meeting at the Charlotte High School.——The Buffalo Surgical Society for its December meeting visited clinics conducted by Dr. Donald Guthrie at Sayre, Pa.

New York City

Guest Lecturers at Medical School.—The Clinical Society of the New York Polyclinic Medical School and Hospital is presenting a series of guest speakers the first Monday night in each month. Dr. Ralph Pemberton, Philadelphia, spoke, November 6, on "Newer Developments in Arthritis"; and Drs. Elliott P. Joslin, Boston, and Francis M. Pottenger, Monrovia, Calif., December 4, on "Diabetic Gangrene—The Chief Menace to the Diabetic Today" and "Conservative Versus Operative Measures in the Treatment of Pulmonary Tuberculosis," respectively. Speakers to come in the series are:

Dr. Frank H. Lahey, Boston, Esophageal Diverticulum: Its Diagnosis, Surgical Management and End-Results, January 8.
Dr. Walter L. Bierring, Des Moines, Iowa, President-Elect, American Medical Association, Coronary Artery Disease, January 8.
Dr. Grant E. Ward, Baltimore, New Developments in Electrosurgery, February 5.
Dr. William D. Cutter, Chicago, The Educational Program of the American Medical Association, February 5.
Dr. John Shelton Horsley, Richmond, Va., Cancer of the Stomach, March 5.
Dr. Dean Lewis, Baltimore, President, American Medical Association, Surgical Diseases of the Breast, April 2.
Dr. George W. Crile, Cleveland, End-Results of Denervation of the Adrenal Glands for Neurocirculatory Asthenia, Peptic Ulcer, Diabetes and Epilepsy, April 2.

Dr. Richard Kovacs is president of the clinical society and Dr. Thomas J. Tobin, secretary.

Course in Physical Therapy.—Six lectures and demonstrations comprise the course in physical therapy to be opened by the Bronx County Medical Society, January 8, under the direction of Dr. Frederick E. Bauer. No fee will be charged. Following is the schedule:

January 8: External Heat Measures, Including Hydrotherapy, Dr. Heinrich F. Wolf.
January 12: Medical Diathermy, Dr. Richard Kovacs.
January 15: Massage and Exercise, Dr. Wolf.
January 19: Low Frequency Currents and Electrodiagnosis, Dr. Kovacs.
January 22: Surgical Diathermy, Dr. William Bierman.
January 26: Ultraviolet Radiations, Dr. Bierman.

Dr. Rice Appointed Health Commissioner.—Dr. John L. Rice, for several years health commissioner of New Haven, Conn., has been named health commissioner of New York, succeeding Dr. Shirley W. Wynne, retired. Dr. Rice, who is 46 years of age, was born in Connecticut. Following his graduation from Johns Hopkins University School of Medicine in 1917, Dr. Rice engaged in medical and sanitary work in Central America, Trinidad and Puerto Rico for the Rockefeller Foundation. On returning to the United States he was health officer of Mason County, Kentucky, and later held a similar position in Albany, N. Y. Dr. Rice is president of the Connecticut Public Health Association. He and Dr. George C. Ruhland, health officer of Syracuse, recently spent several weeks in Germany and Austria as members of a party of municipal executives from American cities, studying public health conditions and problems.

NORTH CAROLINA

University News.—Dr. John Shelton Horsley, Richmond, conducted a clinic at Duke Hospital, Durham, December 2, on lesions of the stomach and colon, and Dr. Eldridge L. Eliason, Philadelphia, December 7, on fractures. Dr. Estella Ford Warner of the U. S. Public Health Service lectured, December 13, on child hygiene and Dr. Charles W. Stiles, also of the service, December 8, on hookworm.

Society News.—Dr. George Curtis Crump, Asheville, addressed the Buncombe County Medical Society, November 6, on diseases of the gallbladder.——Dr. Joseph Colt Bloodgood, Baltimore, conducted clinics on cancer at Wake Forest College School of Medicine, December 1-2.——Dr. Samuel B. McPheeters addressed the Mecklenburg County Medical Society, Charlotte, December 5, on latent and reinfection tuberculosis. Dr. Roy R. Kracke, Atlanta, spoke, November 21, on "The Neutropenic State."

Dr. MacNider Receives Medal.—The Southern Medical Association at its annual session in Richmond in November awarded its annual gold medal for notable achievements in research to Dr. William deBerniere MacNider, Kenan research professor of pharmacology, University of North Carolina School of Medicine. Dr. MacNider is a native of North Carolina, received his education in the state university, and has been a member of the faculty since 1905. He was president of the Medical Society of North Carolina, 1925-1926, chairman of the section on pharmacology and therapeutics of the American Medical Association, 1926-1927, and is at present president of the American Society for Pharmacology and Therapeutics. Since 1930 he has been a member of the National Board of Medical Examiners.

OHIO

Past Presidents' Dinner.—The second annual banquet of the Past Presidents' Association of the Summit County Medical Society was held in Akron, November 22. The three oldest members of the group of about twenty-five, Drs. John Henry Seiler, Dell S. Bowman and Samuel St. John Wright, were elected honorary presidents and Dr. Joseph N. Weller, president. Dr. Seiler, the oldest member, was president of the society in 1898 and in 1903. Following the dinner the remainder of the society was invited to hear an address by Dr. George E. Follansbee, Cleveland, chairman of the Judicial Council of the American Medical Association, on "The Practice of Medicine—Profession or Trade."

Society News.—Dr. Wade W. Oliver, professor of bacteriology, Long Island College of Medicine, Brooklyn, gave an address on science and art, entitled "Continuity," before the Cincinnati Academy of Medicine, December 18.——Dr. Donald G. Ralston, McConnelsville, addressed the Ashland County Medical Society, November 29, on childhood tuberculosis.——Dr. Berton M. Hogle, Troy, addressed the Miami County Medical Society, Piqua, November 8, on anesthesia.——Dr. Herbert M. Platter, Columbus, addressed a joint meeting of the Marion Academy of Medicine and the Marion County Bar Association, November 14, on "Medicolegal Relationships."——Dr. Jonathan Forman, Columbus, addressed the Huron County Medical Association, Willard, November 15, on allergic diseases.

OKLAHOMA

Society News.—Harper County physicians and dentists have formed a society to be known as the Harper County Medical and Dental Society, with Dr. Hardin Walker, Rosston, as president.——Dr. Charles P. Bondurant, Oklahoma City, addressed the Pontotoc County Medical Society, recently, on skin disease.

PENNSYLVANIA

Dr. Reed Wins Academy Prize.—Dr. Josiah F. Reed was awarded the Seibert Memorial Prize of the Harrisburg Academy of Medicine at the annual banquet, November 22. The award, which is $500 to be used in visiting medical centers of Europe, was established in memory of the late Dr. William Seibert, Steelton, by his sister, the late Anna Mary Seibert. It is given every two years to a member of the academy who has done notable work. Dr. Reed is an obstetrician on the staff of the Harrisburg Hospital.

Meeting on Medical Economics.—The Allegheny County Medical Society devoted its entire meeting, December 19, to discussions of emergency health and welfare problems. Speakers were Drs. Harold A. Miller, director, state emergency relief board; Walter E. Donaldson, secretary, Medical Society of the State of Pennsylvania; Benjamin Franklin Royer, vice chairman, state emergency child health committee; Charles H. Smith, Uniontown; Robert A. Knox, Washington, and Henry T. Price, Pittsburgh, chairmen of emergency child health committees in Fayette, Washington and Allegheny counties, respectively; and Alexander H. Colwell, Pittsburgh.

Philadelphia

Society News.—Dr. Arturo Castiglioni, professor of the history of medicine in the University of Padua, delivered the Nathan Lewis Hatfield Lecture of the College of Physicians of Philadelphia, November 29, on "The Medical School at Padua and the Renaissance of Medicine."——Dr. George Dorrance delivered an oration before the Philadelphia Academy of Surgery, December 4, on "Ligation of the Great Arteries of the Neck." Drs. Alexander Randall and Edward Campbell presented a paper on "Value of Nephrolysis, Ureterolysis and

Nephropexy in Selected Cases." —— Dr. Frederick M. Law, New York, addressed the Philadelphia Laryngological Society, December 5, on "Errors in Interpretation of X-Rays of the Mastoids and Sinuses." —— Speakers at the meeting of the Obstetrical Society of Philadelphia, December 7, were Drs. Ross B. Wilson, on "Transverse Positions of Vertex Presentations"; Edward A. Schumann and William E. Parke, "Endometriosis of the Abdominal Wall," and Lewis C. Scheffey, "Infrequent Complications of Uterine Cancer with Certain Clinical Observations."

Joseph W. England Dies. — Joseph Winters England, an Associate Fellow of the American Medical Association, died of a sudden heart attack, December 2, aged 70. Mr. England was graduated from Philadelphia College of Pharmacy and Science in 1883. In 1902 he became consulting pharmacist to the Smith, Kline and French Laboratories, remaining in that capacity until his death. He took an active part in pharmaceutic organization activities, having served as president of the Pennsylvania Pharmaceutical Association in 1926 and of the Philadelphia branch of the American Pharmaceutical Association in 1921. For many years he was secretary of the publication committee of the *American Journal of Pharmacy* and chairman of the committee on publication of the American Pharmaceutical Association. In 1910 he was a member of the Committee on Revision of the Pharmacopeia. He was also active in the affairs of his alma mater, having been secretary of the alumni association from 1904 until his death and for the nine years 1924-1933 chairman of its board of trustees. In 1903 he received the honorary degree of master in pharmacy, honoris causa, from the college. He carried on extensive research and contributed many articles to the literature.

RHODE ISLAND

Superintendent Retires.—Dr. John M. Peters has resigned after forty-four years as superintendent of Rhode Island Hospital, Providence. Dr. Peters came to the hospital as an intern after his graduation from Harvard University Medical School in 1887 and two years later was appointed superintendent. At that time the hospital had 130 beds, in comparison with the present 600, and served 902 patients in a year, compared with more than 10,000 last year. Dr. Peters announced his resignation, November 3, his seventieth birthday, to take effect January 1. Dr. William O. Rice, assistant superintendent since 1909, has been named acting superintendent. Dr. Peters was president of the American Hospital Association in 1909.

TEXAS

Society News.—Physicians of Hardin and Tyler counties recently organized the Hardin-Tyler Counties Medical Society, with Dr. James H. Dameron, Silsbee, as president, and Dr. John F. Shivers, Woodville, as secretary.——Drs. Samuel M. Hill, Dallas, and Edward H. Schwab, Galveston, addressed the Dallas County Medical Society, November 9, on suprarenal insufficiency and hypertension, respectively.——Drs. Robert M. Barton and Robert F. Short, Jr., Dallas, addressed the Henderson County Medical Society, Athens, November 6, on "Cardiac Edema and Its Treatment" and "Surgical Treatment of Empyema in Children," respectively. —— A medical society representing Lamb, Bailey, Hockley and Cochran counties was organized at a meeting at Littlefield, November 21, with Dr. I. J. Sparks, Olton, as president and Dr. John G. Little, Littlefield, secretary. A petition for a charter was sent to the Texas State Medical Association.——The Limestone County Medical Society was reorganized at a meeting in Mexia, November 14. Dr. Joseph F. Moore, Coolidge, is president, and Oscar T. Christoffer, Mexia, secretary.

VERMONT

Society News.—Drs. Thomas E. Hays and Arthur Bradley Soule, Jr., Burlington, addressed the Franklin County Medical Society, St. Albans, November 1, on arthritis.——Dr. Ralph E. Powell, Montreal, Quebec, addressed the Northeastern Medical Society, at Newport, November 10, on genito-urinary infections. —— The Rutland Clinical Club began a series of eleven meetings, November 14, with Dr. John F. Burgess, Montreal, Quebec, as the first speaker, on diseases of the skin and their management.

WASHINGTON

Personal. — Dr. William M. Beach, Shelton, has been appointed health officer of Mason County; Dr. Donald E. McGillivray, Port Angeles, of Clallam County to succeed the late Dr. Walter J. Taylor, and Dr. Allen Bonebrake of Klickitat County.

Hospital News. — A new administration building and a receiving hospital for male patients are under construction at Western State Hospital, Fort Steilacoom, at a total cost of about $300,000. The administration building will replace the present main building.

WEST VIRGINIA

Society News.—Dr. Byrl R. Kirklin, Rochester, Minn., addressed the Kanawha Medical Society, Charleston, November 13, on "Less Commonly Recognized Lesions of the Gastro-Intestinal Tract."——Dr. Solomon L. Cherry, Clarksburg, addressed the Harrison County Medical Society at its November meeting, on "Treatment of Common Diseases of the Heart."—— Dr. W. T. Morris, Coval, discussed the "Automatic Nervous System" at the quarterly meeting of the Wyoming County Medical Society, November 2.——The Cabell County Medical Society met at the Veterans' Administration Facility, Huntington, November 9; Drs. Harvey M. McClure and Agha B. Musa of the hospital staff presented a paper on thromboangiitis obliterans.

WISCONSIN

Appendicitis Increases.—A recent study of appendicitis in Wisconsin shows that the death rate from this disease has increased from 11.6 per hundred thousand of population in 1911 to 18.2 in 1930, or an increase of 56 per cent. Analysis of the cases by groups revealed that the increases took place among children under 10 years of age and persons past 30, mounting with age, with the exception of children under 5. Among the latter the increase was 64 per cent; for the 5 to 9 group, 13 per cent. Delay in calling a physician or refusal to follow his advice was found to be responsible for fatalities in most cases.

Society News.—John A. Lapp, LL.D., professor of sociology, Marquette University, addressed the Milwaukee County Medical Society, December 14, on "Medical Service in the Program of Social Welfare."——Drs. John E. Mulsow and Herbert G. Schmidt addressed the Milwaukee Oto-Ophthalmic Society, November 28, on "Roentgenological Study of the Hypopharynx and Trachea" and "Fracture of the Mastoid," respectively. —— Drs. Alfred W. Adson and Henry W. F. Woltman, Rochester, Minn., addressed the Barron-Washburn-Sawyer-Burnett Counties Medical Society, Rice Lake, November 13, on "Brain and Spinal Cord Injuries."——At a meeting of the Grant County Medical Society, Lancaster, November 2, speakers included Drs. William A. Mowry, Madison, on allergic reactions, and Gunnar Gundersen, La Crosse, on duodenal obstructions.——Drs. Harold E. Marsh and Arnold S. Jackson, Madison, addressed the Marinette-Florence Counties Medical Society, Marinette, November 9, on surgery in heart disease and acute conditions in the abdomen, respectively.

GENERAL

World Narcotics Quotas Issued.—The amounts of narcotics that may be used in every country of the world during 1934 have been announced by the League of Nations under authority of the Narcotics Limitation Convention adopted in 1931 and ratified by the required number of countries early in 1933. The total is nearly 50 tons, valued at approximately $15,000,000 wholesale. For the principal narcotics the amounts are roughly: morphine, 40 tons, including 26 tons of codeine, 1½ of diacetylmorphine, 2¼ of ethylmorphine hydrochloride and 5½ of cocaine. The United States will have the largest quotas in the world, except for diacetylmorphine, which is not allowed to enter the country. The maximum amounts for the United States of the five most important narcotics are: morphine, 9,865 Kg. 336 Gm.; diacetylmorphine, none; codeine, 6,044 Kg. 505 Gm.; ethylmorphine hydrochloride, 522 Kg. 968 Gm., and cocaine, 1,140 Kg. 688 Gm. Germany, France, Russia and Japan receive the next largest amounts. The convention requires each country to submit each year by November 1 an estimate of the amount it expects to require for medicinal purposes during the next year and if these estimates appear excessive the league may make inquiries, though it has no power to change the estimates. If a country does not submit an estimate, the league has authority to decide its needs and to enforce its decision. Forty-five countries and eighty-three territories submitted estimates for 1934 and the league board fixed quotas for twenty-three countries and thirty-one territories. Among the latter were Russia, China, Mexico, Argentina and Brazil. Russia, however, later submitted estimates,

Foreign Letters

LONDON

(From Our Regular Correspondent)

Dec. 9, 1933.

Progress in Technic at the Radium Institute

The report of the Radium Institute for 1932 shows important improvements in the treatment of cancer of the cervix and cancer metastases in the neck. In treating cancer of the cervix, it has been possible by a new form of vaginal applicator to increase dosage while increasing filtration, so as to keep within the limits of tolerance. The vaginal applicators now in use are spherical or cylindric, with rounded ends, so as to distribute pressure more evenly on the vaginal mucosa. The spheres are made of vulcanite, are 17 mm. in diameter, and are perforated by a canal 7 mm. in diameter, into which fits a platinum container with a wall thickness of 1.5 mm., secured by a vulcanite plug at each end. The container can be filled with any desired amount of radon, which is contained in glass capillary tubes. The cylindric applicators are of bakelite with a wall thickness of 5 mm. and contain a platinum tube 2.2 cm. long, in which the radon tubes are placed. The activity of the vaginal applicators has been increased from 10 mg. of radium to 15 millicuries of radon. For intra-uterine application a gum elastic sheath 8 cm. long and 0.8 cm. in diameter holds three radium tubes in tandem, each containing 10 mg. of radium element. The uterine applicator and three or four vaginal applicators are inserted under gas-oxygen anesthesia and left for forty-eight hours. This combined application is repeated after a week, but between the two a further vaginal application is made forty-eight hours after the first in the knee-chest position. This technic gives a dose of 2,880 mg. hours in the uterus (the same as before) but an increase in the vaginal dose from 5,040 mg. hours to from 5,500 to 7,000, according to whether three or four vaginal applicators are used.

In treatment of cancer metastases in the neck, the new technic seems to hold out more promise of success for the difficult problem of glandular metastases in the neck in cancer of the tongue. The present method consists in using a small number of high content tubes at increased skin distance. With a distance of 4 cm. it was found that large fixed glandular masses disappeared. So far the method has been confined to inoperable cases, but the results seem to justify extension. A Columbia paste collar 2 cm. thick is made, and the radioactive tubes are mounted on blocks of balsa wood 2 cm. thick. The tubes are 4.5 cm. long and the filter is 2.5 mm. of lead attached to the wood. Generally four tubes are used, being arranged as a square of from 64 to 144 sq.cm. The upper tube is parallel to and at the level of the lower ramus of the mandible when the superior cervical glands are involved. The time of exposure has gradually been increased until it is now ten hours daily for twenty days. Each tube contains 50 millicuries of radon and is made up to its original content every morning. The dose given is 280 millicurie days. The reaction is severe; there is a destructive dermatitis over a wide area and the patient feels ill for two or three weeks. The time is too short for a final estimate of the method, but the results are better than any previously attained.

Lead in Canned Sardines

At the Society of Public Analysts, Dr. L. H. Lempitt and a collaborator read a paper reporting that canned sardines had been found seriously contaminated with lead. An apparent connection existed between the amount of solder exposed in the can and the lead content of the sardines. But solder was not the only source of lead, for it had been found in sardines packed in cans in which no lead could be derived from the container. It had been shown that sardines cooked on grills covered with so-called tin containing appreciable quantities of lead were badly contaminated with the latter, whereas if pure tin was used the lead content of the sardines fell to a negligible figure. The metal of the grills was the chief source of contamination with lead. The lead content of sardines should not be substantially more than from 5 to 8 parts per million. Higher figures indicated avoidable contamination in the preparation of the sardines before canning.

Epidemic of Gastro-Enteritis Affects a Whole Town

The town of Kidderminster, with a population of 30,000, has been stricken with an epidemic of gastro-enteritis, which has swept through it like one of the ancient plagues. One big school has had to close down and many business and work shops have been working with only half their staffs. Children have been most severely affected. The cause is supposed to be some contamination of the water supply. Policemen have made a door-to-door tour and handed notices to all householders advising them to boil their water for at least ten minutes before using it. Notices to this effect are also displayed everywhere, including the cinemas. It is supposed that the heavy rains following the recent drought has caused "foreign water" to drift into the water supply and brought the contagion. A chlorination plant has been installed in the reservoir, which has led to continuous improvement in the quality of the water.

Reduction of Crush Fractures of the Spine

In 1930 Mr. R. Watson Jones of Liverpool called attention to a simple method of reducing crush fractures of the spine, now so common a result of automobile accidents, which can be carried out by any one who knows the rudiments of plaster work. The kyphotic deformity produced is due to acute flexion at the site of injury. If the patient is placed prone, supported only by his arms at the side of his head and by the front of his thighs and legs, leaving the trunk entirely unsupported, body weight alone is sufficient to give perfect anatomic reduction. Mr. Jones recommends that reduction be performed by arranging two tables end to end, with a space between slightly greater than the length of the patient's trunk. The front table is raised on blocks or chairs, so that it is about 2 feet higher than the other. The patient is lifted face downward on to the lower table, and a double layer of stockinet pulled over the trunk and stitched over the shoulders and beneath the perineum. He is then assisted into such a position that he is gripping the edge of the higher table with his abducted arms, his head resting on a small pillow. The lower table supports his lower limbs as high as the upper part of the thighs, but between the groin and the neck there is no support. In this position he is unable to prevent his spine from sagging into full hyperextension. A plaster jacket is applied at once. At the recent meeting of the British Medical Association Mr. W. S. Haughton of Dublin endorsed the advice of Mr. Jones that these patients should be transported face downward. If the patient is placed face downward on the stretcher with a roll of coat or blanket under the upper part of the chest and another under the pelvis, the spine will sag into hyperextension and even reduction of the deformity may take place during transport. This method of transport is now taught to ambulance surgeons.

Hospitals to Be Compensated for the Treatment of Road Accidents

The great strain on the resources of hospitals due to the treatment of automobile accidents has been reported in previous letters. Thanks largely to Lord Moynihan, this condition is to be remedied. According to the law, drivers of automobiles must hold a policy of insurance against the cost of accidents. A clause has been added to the road traffic bill providing that

when any payment is made under policy of insurance or by the owner of the vehicle in respect of death or bodily injury arising out of the use of an automobile on a road, and the dead or injured person has received treatment from a hospital, the insurer or owner must pay to the hospital the reasonable expenses incurred in such treatment up to $250 for each person treated as an inpatient and $25 for each person treated as an outpatient. In calculating these expenses, money received by the hospital in payment of a specific charge is to be deducted, but not money received under any contributory scheme. The cost of treating patients is to be calculated as the average daily amount of cost for each inpatient and the maintenance of the hospital and staff. At present many hospitals situated near the great highways are occupied with automobile accidents to the exclusion of those cases for which they were originally intended. It is calculated that the voluntary hospitals of this country are out of pocket to the extent of $750,000 a year at least for the treatment of automobile accidents. The clause was agreed to without a division in the house of lords.

Payment of Physicians for the Treatment of Road Accidents

Physicians who give emergency treatment in road accidents have a grievance similar to that of the hospitals. In the house of lords, Lord Moynihan moved the second reading of the road traffic (emergency treatment) bill. He said that only about one physician in twenty received either thanks or remuneration for the emergency treatment of road accidents. He originally suggested that a maximum fee of $15 would meet the case, but it was pointed out that a maximum fee would probably become the standard fee, which would be excessive. After a discussion the committee decided that $3 would be a fair charge. He suffered a good deal of criticism from physicians for agreeing to this decision. In a great many cases it would be too little, but it is better than nothing, which was what the majority got now. This sum would be paid by the insurance companies as part of the "third party risk." In supporting the bill, Lord Dawson, a physician, said that physicians worked hard and looked forward to a quiet Sunday, but that was the day of all others when they were likely to be called to road accidents. In many cases the cost of the dressings they had to supply was a substantial sum. For the government the earl of Plymouth objected that the bill would fasten a liability on a man in respect to an accident for which he might not be in the least responsible. He sympathized with the grievance of hospitals and physicians, but he doubted whether the bill provided the right remedy. The government could not accept it and if it reached the house of commons would not undertake to provide facilities for its passage. Lord Moynihan expressed disappointment and urged the house to give the bill a second reading, which it did.

The Recognition of Foreign Medical Qualifications

At the opening session of the general medical council the president, Sir Norman Walker, explained the conditions under which physicians from foreign countries or other parts of the British Empire could be registered and so enjoy all the privileges of British physicians. If the council was satisfied that the qualifications furnished a sufficient guaranty of knowledge and skill for the efficient practice of medicine, surgery and midwifery, it might recognize such qualifications. It is lawful to practice in Great Britain without a qualification, but an unqualified person cannot hold any medical appointment, do panel work, sign a death certificate or sue for fees. Most of the British colonies and dominions control medical education and registration, and the council has found it easy to estimate the standards of any dominion with a view to giving or withholding reciprocity.

PARIS

(From Our Regular Correspondent)

Nov. 22, 1933.

The French Congress of Therapeutics

The Congrès français de thérapeutique, a new creation, was founded by Professor Loeper, who served as its first president. The first session, held at the Faculté de médecine, was well attended by scientists from all countries of Europe. In his inaugural address, Professor Loeper brought out that modern research in physiology, biologic chemistry, pharmacodynamics, physical therapy, serotherapy and organotherapy had completely transformed the old type of therapeutics, which justified the creation of this congress. So many communications were offered that it was necessary to organize three sections (medicine, pharmacodynamics, physical therapy), each held in a separate hall. The medical section considered, first, parenteral treatment of gastroduodenal ulcer. Professor Devoto of Milan described the good results secured by the subcutaneous or intravenous injection of various substances, among which he prefers sodium benzoate. He did not give an interpretation of its mode of action, although it is possible that it stimulates the secretion of hydrochloric acid. The cures effected in this manner are, however, not permanent. François Moutier discussed treatments by shock methods and by vaccinations, referring to vaccines prepared with the micro-organisms of dental pyorrhea. Mr. Debray dealt with the organotherapy, particularly injections of pepsin. Professor Glaessner of Vienna spoke on the same subject and also on the use of insulin and parathyroid hormones. Professor Pribram of Berlin, Mr. Feissly of Lausanne, Guido Mann of Triest, Mr. Hernando of Madrid, Mr. Besse of Geneva, Mr. de Beco of Brussels, Mr. Dinkin of Berlin, Mr. Vilardell of Barcelona, Mr. Foyer of Amsterdam, Pavel and Florin of Bucharest, and numerous French specialists, presented their views, without forming the basis for any generally accepted opinion, for all the treatments proposed were presented as having been successful. Another question studied was the treatment of colibacillosis. Fourneau and Bovet gave a complete survey of all urinary antiseptics. Professor Vincent, in collaboration with Mr. Pacquet, gave an exposition of his general treatment with his anticolibacillary serum, which is applicable in all manifestations of Bacillus coli, including cholecystitis and neuropathic disorders. Mr. Baruk emphasized the last point and discussed colibacillary psychoses, frequent cases of which follow pyelonephritis and the puerperium. Mr. Chevassu reported his experience with Vincent's serum in urinary surgery, during the previous nine years. He reserves it for serious cases of septicemia and pyelonephritis, and as preparation for operative interventions. Mr. Hauduroy spoke on the uses of vaccines, autovaccines and bacteriophages in colibacillosis. Numerous communications were then presented recommending widely different forms of treatment: acridine, neoarsphenamine, derivatives of phenyl salicylate, vaccinotherapy, mineral waters and opotherapy, in endocrinosympathetic dysequilibrium. The congress was supplemented by a comprehensive exhibit of pharmaceutic specialties.

Congress of the Anatomic Society

The congress of the Société d'anatomie was presided over by Professor Roussy. Two topics were discussed comprehensively. The first topic concerned the mechanism of cerebral hemorrhages. Prof. H. T. Deelman of Groningen took up the theory of Rosenblatt, which denies that cerebral hemorrhage has but one cause, as commonly believed; namely, rupture of a blood vessel. Rosenblatt contends that there are small hemorrhagic foci produced in advance by an alteration of the cerebral substance itself. Deelman thinks that such foci are only secondary and that one can provoke a cerebral hemorrhage by a partial obstruction of the arterial circulation. Prof. P.

Schwartz of Frankfort-on-Main thinks that there are three types of cases: (1) lesions following vascular obliterations due to emboli; (2) lesions following obliterations due to arteriosclerosis, and (3) lesions without vascular obliterations or apoplexy due to hypertonia. Jean Lhermitte submitted a comprehensive paper on the subject. He pointed out that Charcot and Bouchard's theory of miliary aneurysms is no longer tenable. Cerebral hemorrhage is a complex phenomenon, made possible by the fragility of the cerebral parenchyma, and is precipitated by a sudden stoppage in the arterial system. An anatomic study on the innervation of the visceral pedicles was the subject of papers by Professor Delmas of Montpellier and by Professor Kiss of Szegedin, who reached the conclusion that the structure of these pedicles is identical in the whole organism. Their fibers and cells are of the sympathetic type but combined with somatosensory fibers. There is therefore no reason to assume the existence, in the autonomic pedicles, of two categories corresponding to the orthosympathetic and the parasympathetic.

French Congress of Orthopedics

At the French Congress of Orthopedics, presided over by Professor Mathieu, Dr. Mutel of Nancy presented a paper on "Open Methods for the Reduction of Luxation of the Hip." Such methods are suited to only 8 per cent of the cases in children, and in adults only to the cases in which other methods have not given good results. This type of surgery often leads to ankylosis and should be rejected in bilateral luxations. One can base some hopes on the results of resection of the bone, which adapts the length of the femur to the shortened muscle but imposes a permanent limp. The lively discussion that followed showed that, in France at least, the open method has few advocates. Even Mr. Mathieu opposed it, pointing out that it produces stiffness in the simple cases, that it is a grave intervention in difficult cases, and that, in fact, the technic is not yet well worked out.

Another paper, presented by Dr. Richard of Paris, dealt with chronic arthritis of the spinal column, a problem that is imperfectly understood and in which no diagnostic precision can be reached without radiography. He described the numerous types and also the disorders that may simulate it. The treatment varies, requiring in some cases immobilization (tuberculous arthritis) and in some cases progressive mobilization, after disappearance of the muscular contracture through rest, and requiring the use of radiotherapy and thermal treatments. Further communications were presented by Mathieu, Ombredanne, Roederer, Frölich, Trèves, Mauclaire, Rocher, Ponzet, Meyer, Guérin and Delahaye. The congress next year will consider "Le thorax en entonnoir" (chief speaker, Mr. Garnier), and "Treatment of Spasmodic Paralysis, the Little Syndrome, and Encephalopathies" (chief speakers, Roudil of Paris and Delchef of Brussels). In 1935 the congress will consider "The Pathogenesis and the Treatment of the Volkmann Syndrome."

The French Assembly of General Medicine

The October session of the French Assembly of General Medicine was devoted to a study of syphilis in France. The chief speaker, Mr. Godlewski, stated that, during the five years that followed the war, there was a considerable increase in the cases of syphilis, then a rapid decline between 1925 and 1929. The situation at present is stationary, but there is a marked contrast between the frequency of syphilis in the rural districts and in the cities, the latter constituting veritable reservoirs of virus. There is no great difference in the relative distribution among the various social classes, but the situation is much better than formerly in the army and in the navy, in which prophylactic measures are vigorously employed. Syphilis too often remains unrecognized until the appearance of the tertiary stage. Tabes has become less grave, and one sees nowadays few severe cases of ataxia such as were formerly observed. Visceral localizations, especially aortic, are still frequent. It is generally noted that modern treatment of syphilis has greatly diminished its gravity. Recent cases of syphilis are more quickly suppressed than formerly, but so-called abortive treatment has not proved its efficacy and may give a false sense of security. The Wassermann test is still needed, but the negative results should be interpreted in a critical spirit. Clandestine prostitution is the origin of syphilis in two thirds of the cases, in both the rural districts and the cities. Medically supervised prostitution is, to be sure, immoral, but it decreases the danger of infection. The antivenereal dispensaries have not given as good results as were expected, for patients, fearful of publicity, hesitate to visit them, often preferring to consult a practitioner who is not a specialist rather than the family physician. During the discussion, the extension of prophylaxis through the teaching of youth the dangers of venereal disease was unanimously approved. The exceedingly difficult differentiation of syphilitic aortitis and atheroma of old age was discussed at length. The present treatment of syphilis is still the subject of much controversy. An interesting graph prepared by Mr. Rimé enabled the assembly to note the relative quantities of the various drugs employed since 1920. It was clearly seen that trivalent arsenic is less used than formerly. Bismuth, particularly the liposoluble forms, and mercury are being more widely used. Pentavalent arsenic has not sensibly varied since its appearance.

Resignation of Robert Davis

Robert Davis has resigned as superintendent of the American Hospital at Neuilly, which post he had accepted only for a period of eighteen months, by reason of other duties as head of the American Library in Paris. Dr. MacIlroy, director of the school of medicine of Richmond College, has been summoned as his successor.

BERLIN

(From Our Regular Correspondent)

Nov. 20, 1933.

The Congress of Gynecology

The congresses held this year have not been so numerous as usual, but the Deutsche Gesellschaft für Gynäkologie held its regular congress in October, under the chairmanship of Stoeckel. The first topic on the program concerned gynecologic hemorrhages. Schröder of Kiel dealt chiefly with anomalies of menstruation. Instead of the usual terms menorrhagia, oligomenorrhea, polymenorrhea and metropathia, Schröder proposes a less ambiguous terminology. He divides the anomalies of menstruation into five classes: (1) increased and excessive menses, (2) too frequent or too rare menses, (3) supplementary hemorrhages, (4) hemorrhages not recognizable as menstrual discharges, and (5) hemorrhages during the menopause. He emphasized the importance of the constitution with reference to these disturbances. Changes in the menstrual cycle often result from marked external influences; for example, after severe accidents. The importance of psychic influences affecting the menstrual cycle, while no doubt such exist, must not be exaggerated. Runge of Greifswald, in discussing treatment, warned against the uncritical use of organotherapeutic preparations. In the treatment of amenorrhea, the onset of menstruation following the administration of certain preparations is not conclusive proof of their efficacy. The treatment of recurrent, climacteric metropathia haemorrhagica is, relatively, firmly established. The preferred therapy is the equivalent of castration but effected by roentgen irradiation. When occurring in young women, the problem is vastly more difficult, as the objective is to restore to normal functioning an ovary that is evidently functioning in

an inadequate and possibly also an abnormal manner. Opinions as to the value of radium irradiations were widely divergent. Whereas one group rejected them entirely, others emphasized that mild radium irradiation had often been found to have life-saving value in hemorrhages occurring in juveniles. In young women, the corpus luteum hormone is often likewise effective.

OPERATIONS BASED ON EUGENIC INDICATIONS

In discussing the second topic, "Operations Based on Eugenic Indications," the speakers expressed absolute approval of the new law pertaining to sterilization (THE JOURNAL, Sept. 9, 1933, p. 866). Professor Kohlrausch of Berlin, a specialist in criminal law, called attention to the fact that hitherto the law did not justify an interruption of pregnancy based on eugenic indications. Bumke, psychiatrist of Munich, pointed out that mental disease had shown an increase in recent years. The indications for the interruption of pregnancy in mental patients depend on the degree of probability that the offspring will be abnormal, which can be assumed only in case both parents are mentally ill. The hereditary influence transmitted by weak-minded persons is not yet fully established; but if both parents are weakminded the assumption is that 70 per cent of the offspring will be weakminded; if only one parent is weakminded, the assumption is that about 50 per cent of the offspring will be weakminded. In schizophrenia, with which 70 per cent of the mental patients in institutions are affected, a child has 50 per cent of a likelihood of becoming mentally ill if both parents are affected and 7 per cent of a likelihood if only one parent is schizophrenic. In weakmindedness and in schizophrenia, the factor of education plays a large part in the decision, for often such parents are susceptible of being educated. Schizoid subjects should not be sterilized. The decision is difficult in epilepsy; for, while true epilepsy may be transmitted to offspring, the tendency cannot be said to be dominant; hence the decision must be based on the circumstances surrounding the individual case. If the symptoms of manic-depressive subjects are mild, sterilization should not be considered, but it becomes a question if the depressions are severe. The sterilization of alcohol addicts, if the condition is severe, is much to be desired; for alcohol addicts are most unsuitable as fathers of families.

During the general discussion, physicians with Catholic antecedents pointed out that the sterilization law must be considered not only biologically but also metaphysically and ethically, with a borderline area between medicine and moral theology. The Catholic view compels the rejection of this law on ethical grounds, as it cannot assume the responsibility of separating sexual union from the propagation of new life.

CANCER OF THE CERVIX

The third main topic considered the early diagnosis and treatment of cancer of the cervix uteri. Hinselmann of Altona discussed the value of frequent colposcopy. Every leukoplakia should be regarded as a warning and it can always be discovered with the colposcope. An erosion demands no less attention. Von Mikulicz and Radecki (Königsberg) spoke on the radical operation, and Eymer (Heidelberg) on radiation therapy. These papers revealed that operation and irradiation are still contending for the supremacy. An important outcome of the whole discussion was the draft of a law, which the Deutsche Gesellschaft für Gynäkologie submitted to the federal ministry of the interior. In this bill the proposal is made to restrict absolutely the treatment of cancer patients to licensed physicians. The suggestion is made, too, that the insurance carriers (namely, the krankenkassen) be required to subject annually every woman more than 30 years of age to an examination for cancer. The fourth topic on the program was "New Results of Research on Twins," which was presented by Verschuer of Berlin. The next session of the congress will be held in Munich, in October, 1935.

ITALY

(From Our Regular Correspondent)

Oct. 15, 1933.

Discussion of Immunity at the "Volta" Convention

Each year there is held in Rome a convention organized by the Fondazione Alessandro Volta (associated with the Royal Academy of Italy), which is attended by some of the most eminent scientists in the world. The chief event of this meeting is the consideration of a single precisely drawn scientific topic, which reflects the progress of a scientific activity rather than its history and constitutes an attempt to unify the theories and the results of recent experiments. The topic chosen this year was "Immunity and Immunology." The convention was presided over by De Blasi, professor of hygiene at the University of Naples, and the principal nations of Europe and America were represented. The delegates from the United States were Landsteiner, Flexner and Kahn; from England, Nuttal, Topley, Muir and Wright; from France (among others), d'Herelle and Besredka.

SEROLYSIN

The first meeting was presided over by Professor Landsteiner, Nobel laureate and member of the Rockefeller Institute in New York. Professor Petterson of Stockholm presented a paper on "Beta-Serolysin," which is a bactericidal substance in the blood serum different from the Buchner lysin, from which it may be distinguished by the fact that it is more resistant toward the influences that tend to block the bactericidal action of the serum. It is found in part in the precipitate euglobulin, and its bactericidal potency may be demonstrated in solutions of globulin. Certain micro-organisms under the action of the lysin do not provoke any formation of bacteriolytic immune bodies. If in the immunized animal an increase of bactericidal potency is observed, it should be attributed to other influences than the leukocytes. It is impossible to increase the specific bactericidal capacity when it is a question of acting on bacteria on which the cells of the organism itself do not exert a destructive action. As an example of a practical application of this fact, against anthrax and local staphylococcic infections active immunization by means of killed staphylococci is indicated. Professor Maragliano of Genoa affirmed that in tuberculosis any immunity present does not appear to be essentially an anti-bacterial immunity. The micro-organisms undergo various changes but are not destroyed and remain, for the most part, living and enclosed in old foci. Experiments show that, while it is easy to modify the germs coming from without, it is difficult to act on those already present in the body. The early infiltrate, which is regarded as the result of an exogenic reinfection, is, on the contrary, the rekindling of foci apparently extinguished but still certainly having an active influence.

Professor Rondoni agreed that immunity against tuberculosis is essentially histogenic, fibrogenic and encapsulative. His search for bacteriolysins proved negative. In 1915 and 1916 he studied the histologic reactions in tuberculous reinfection, demonstrating an early hematogenic reaction or polymorphonuclear mobilization in reinfected animals subjected to vital staining.

Professor Weichardt pointed out that one must distinguish between protective substances already present physiologically and substances obtained by means of immunizing processes. These various processes endeavor to eliminate the infection and, when their influence is not sufficient, the antibodies intervene.

IMMUNOCHEMICAL SPECIFICITY

The topic discussed by Karl Landsteiner of New York was "Immunochemical Specificity." He dealt with complex antigens obtained by means of combinations of various chemicals with protein substances and with the natural complex antigens. He described recent researches on peptides and the marked individual differences that are brought out experimentally in animals

of the same species. In discussing the paper, Professor Abderhalden said that by experiments on defensive ferments it was possible to differentiate between strictly specific antigenic substances. The studies of the speaker are a bridge, so to speak, between physiology and immunity for the solution of the problem of the composition of proteins, which it seems impossible to solve by chemical means. Professor Doerr of the University of Basel surveyed experiments carried out by his school on the antigenic action of arsenical compounds, and searching then for arsenic in the antiserums secured. It was found that the latter do not contain arsenic and hence cannot be derived from the former; it is impossible, therefore, to synthesize antigens artificially.

In his paper on "The Bacteriophage in Its Relations to Immunity," Prof. Felix d'Herelle presented evidence to show that every man and every animal has in the intestine a bacteriophage that lives in symbiosis. Its activity is not specific but it has a variable potency. If it is very potent the bacterium succumbs; if it is less potent the micro-organism may resist it and acquire immunity to it, and then the bacteriophage is destroyed or accommodates itself to a bacteriophagic symbiosis. Recovery from infectious diseases does not result from an immunizing process but from the bacteriophage and from the reactions that it provokes. The speaker demonstrated interesting therapeutic applications with bacteriophage in the prophylaxis and treatment of infectious diseases. A lively discussion followed the presentation of Professor d'Herelle. Professor Bertarelli of the University of Pavia asked questions about the thermolability of the bacteriophage and as to whether it was possible to set up a standard method to determine its presence. Professor Besredka of the Pasteur Institute in Paris asked the speaker how a bacteriophage injected intravenously can act when a small quantity of blood serum is capable of inhibiting its action. Professor Degkwitz of the University of Hamburg remarked on the composition and physical properties of the bacteriophage, which he regards as a ferment. In response to all questions, Professor d'Herelle reaffirmed that the bacteriophage is living matter and that its curative action is unquestionable. The process of recovery is through contact by the same route as the causal disease, as has been observed in various epidemics.

THE THEORY OF ANAPHYLAXIS

Professor Doerr of the University of Basel presented the official paper on the theory of anaphylaxis. He pointed out that the resemblance that some have endeavored to establish between the histamine reaction and the anaphylactic reaction is not tenable. There are substantial differences between the two reactions; for example, in the period of latency and in the fact that, whereas repeated stimuli applied in the same concentration are always equally effective, in anaphylactic experiments, on the contrary, it is necessary to increase considerably the dose of antigen, in order to secure a later muscular contraction. His experiments on anaphylactic heredity have forced him to assume the existence of a latent form of antibodies. The discovery of passive anaphylaxis and the reversibility of these experiments show that there does not exist an increased or a pathologically changed reactive capacity of the cells but only a normal susceptibility to the reactions of antibodies.

Professor Zironi, director, Institute of Microbiology, University of Milan, who spoke on allergy in infectious diseases, pointed out that not all allergic phenomena can be regarded as manifestations of hypersensibility, in the strict sense of the word, since many cases are due chiefly to a conflict of antigens with antibodies, independently of the sensitivity or reactivity of the cells. With regard to the causes of the hyperactivity, Professor Zironi said that the research on the subject is far from complete and that it would be necessary to study the period of incubation of the infections, the problem of the virulence of the organisms, the genesis of the predisposition to the infections, and the course of many diseases. In the general discussion, Professor Frugoni of Rome described research carried out by his pupils, on the basis of which it has been discovered that, in typhoid and in sepsis lenta due to Streptococcus viridans, the increase of antibodies in the circulation coincides with the disappearance of the bactericidal potency of the blood.

Professor Caronia of the University of Naples described his research and the research of Professor De Cristina on the phenomena of sensitization and desensitization, affirming that recovery from infections occurs through the spontaneous development of desensitization of the patient, a process that can be provoked also by introducing into the organism, preferably by vein, small quantities of proteins of the micro-organisms causing the disease.

The Lombard Medical Society

At a meeting of the Lombard Medical Society, held in Milan, Silvano spoke on the hemoglobin in pulmonary tuberculosis. He pointed out that tuberculous anemias are due to toxic hemolysis rather than to defective regeneration of red corpuscles. Therapeutic pneumothorax and phrenic exeresis reduce the hemolysis, with improvement in the anemia.

Arrigoni and Cossali reported their observations in a number of cases of hemolytic splenomegalic icterus. They admit the possibility that a primary fragility of the blood cells and a primary hyperactivity of the reticulo-endothelial system are essential factors underlying the hemolysis. Anatomic research reveals that, in hemolytic icterus, the hyperplasia of the reticulo-endothelial system, although varying in degree in various cases, is usually of a uniform character; namely, splenohepatic, lymphoglandular or medullar. The organ most commonly attacked is the spleen. Splenectomy is always of great benefit in the treatment of the pure types of hemolytic icterus. It is particularly indicated in cases in which, in addition to the characteristic hematologic and clinical manifestations of the disease, there are signs of other constitutional anomalies. The speakers regard biopsy of the liver, for diagnostic and prognostic purposes, as useful and advisable, to be applied in connection with any operative intervention performed on patients who present a splenopathy.

Chiovenda described twelve cases of glioma of the brain in which diagnosis of cerebral hemorrhage or softening of the brain (seven cases), encephalitis (three cases) and meningitis (two cases) were made. In the cases observed by the speaker, there were no connections between regressive phenomena, course, localization and the histologic type of the glioma.

Prophylactic Vaccinations

Professor Madsen of Copenhagen, chairman of the Health Committee of the League of Nations, has published an article on vaccination applied during an epidemic to prevent an increase of the susceptibility to the infection, namely, the so-called negative phase. The report of the International Committee on Standardization shows that in the field of vaccination the fears are entirely unfounded. On the basis of his research, Madsen interpreted the rapid decline of the antitoxic potency of the serum to the neutralization or the fixation of a part of the antitoxin injected into the circulation. He explained that the later increase of antitoxin may be due to its formation or to its release from the organs, or to a partial intravascular dissociation of the total antitoxic antigen formed originally. On the interesting problem of the negative phase, questions were asked by Professor Ramon of the Institut Pasteur de Paris, Professor Doerr, Professor Kolle, and others.

Prof. Lecomte De Nouy called attention to two phenomena that characterize immunity: the diminution of the absolute

potency of the static surface tension of the serum solution in the animal immunized or sensitized and the absolute increase of viscosity of the blood serum following the addition of antigens. He affirmed that the organism preserves the record of the reaction in the form of immunity. Although the serum has regained its normal behavior, it has been markedly changed with regard to viscosity and to its physicochemical equilibrium.

Professor Sachs of Heidelberg surveyed and criticized the fundamental theories of various methods of immunodiagnosis. Professor Ramon of the Institut Pasteur presented a paper on the anatoxins, emphasizing the importance of the diphtheritic anatoxin, the present better method of obtaining it, and the essential qualities of the product, the innocuousness, the intrinsic antigenic value, and the immunizing action and the irreversibility. He praised the official decree in Italy, which makes vaccination compulsory in the primary schools for children aged 1 to 5, when diphtheria is prevalent endemically.

Professor Schilling of Berlin offered a communication on immunity in disorders due to protozoa, with especial reference to malaria in children.

Professor Kolle of the University of Frankfort-on-Main spoke on immunity in spirochetoses, particularly in syphilis. He emphasized that in human syphilis there is no proof of an active immunity.

Marriages

CLAUDE HENRY FRYAR, Oak Ridge, N. C., to Miss Lucie Sutton Hayes of Palmer Springs, Va., Nov. 29, 1933.

CHARLES DOUGLAS SAWYER, Port Chester, N. Y., to Miss Ruth Partridge of Maplewood, N. J., Dec. 9, 1933.

HAROLD HERMAN FREEDMAN, Freehold, N. J., to Miss Marian Winters of New Brunswick, July 28, 1933.

CLOYCE R. TEW, Raleigh, N. C., to Miss Anna Rebekah Waaser of Mauch Chunk, Pa., Sept. 8, 1933.

CHARLES WESLEY MYERS, Indianapolis, to Miss Marguerite Preston of Knoxville, Tenn., Nov. 28, 1933.

RAY EDWARD CURRIE, Medical Lake, Wash., to Miss Frances Eleanor Joseph of Spokane, Sept. 10, 1933.

CHARLES KENNEDY CAREY, Rushville, Ill., to Miss Geneva Strong at Mount Vernon, Dec. 10, 1933.

JOHN TALBOT GERNON, Chicago, to Miss Lorene Fredericka Mueller of Minneapolis, Dec. 2, 1933.

CARL CAUGHMAN SOX, Columbia, S. C., to Miss Alluwee Babb of Spartanburg, Aug. 15, 1933.

LEO SMITH, Pearson, Ga., to Miss Dorothy Elizabeth Quillian of Milledgeville, Oct. 25, 1933.

LEVI STEELY SILER, Corbin, Ky., to Miss Dorsie Pemberton, at Jellico, Tenn., Oct. 7, 1933.

ISAAC RIDGEWAY TRIMBLE to Miss Margaret Price Brown, both of Baltimore, Sept. 16, 1933.

SOUREN H. TASHJIAN, Seattle, to Miss Margaret Cahalan of Yakima, Wash., Nov. 4, 1933.

OREN C. TARBOX to Miss Edythe Pearl Howe, both of Oneonta, N. Y., Aug. 26, 1933.

EVON WALKER to Mrs. Leota Montgomery McWee, both of Ottumwa, Iowa, Sept. 6, 1933.

JAMES ALLEN SMITH, Macon, Ga., to Miss Sarah Jennings of Thomasville, Oct. 12, 1933.

JOSEPH MCCRARY, Bold Spring, Tenn., to Mrs. Azalee Reynolds in December, 1933.

WARDE BAUXTON ALLAN, Baltimore, to Miss Angelica Peale Iglehart, Dec. 2, 1933.

NORMAN W. GILLESPIE to Miss Mildred Nicholson, both of Boston, Oct. 26, 1933.

WILLIAM C. KEYES to Miss Emma Filsinger, both of Bellingham, Wash., recently.

ROBERT G. SMITH to Miss Mary Poly, both of Columbus, Ohio, recently.

WALTER S. GRISWOLD to Miss Jessie Reeves, both of Seattle, Aug. 20, 1933.

Deaths

George Paull Marquis, Chicago; Northwestern University Medical School, Chicago, 1892; member of the Illinois State Medical Society, the American Academy of Ophthalmology and Oto-Laryngology and the American Laryngological, Rhinological and Otological Society; fellow of the American College of Surgeons; formerly assistant professor of laryngology and rhinology at his alma mater; veteran of the Spanish-American War; attending otolaryngologist to St. Luke's Hospital; aged 65; died, Dec. 22, 1933, of tuberculosis of the large intestine.

Matthew Kollig, Saginaw, Mich.; University of Michigan Medical School, Ann Arbor, 1907; member of the Michigan State Medical Society; past president of the Saginaw County Medical Society; fellow of the American College of Surgeons; formerly instructor in anatomy at his alma mater and professor of anatomy, George Washington University School of Medicine, Washington, D. C.; on the staff of St. Mary's Hospital; aged 52; died, Nov. 28, 1933.

Matthew D. Fullingim, Denton, Texas; Fort Worth (Texas) School of Medicine, Medical Department of Fort Worth University, 1899; member of the State Medical Association of Texas; past president and secretary of the Denton County Medical Society; for two years city health officer of Denton and physician to the North Texas State Teachers College; aged 60; died suddenly, Oct. 16, 1933, of heart disease.

Courtney Perry Grover, Dayton, Ohio; Kansas Medical College, Medical Department of Washburn College, Topeka, 1904; member of the Ohio State Medical Association; fellow of the American College of Surgeons; served during the World War; formerly on the staffs of the National Military Home Hospital and St. Elizabeth's Hospital; aged 52; died, Nov. 29, 1933, of streptococcic pharyngitis and diabetes mellitus.

George Graham Hunter ✱ Los Angeles; University of California Medical Department, 1906; fellow of the American College of Physicians; councilor at large of the California Medical Association and past president of the Los Angeles County Medical Society; aged 57; on the staff of St. Vincent's Hospital, where he died, Dec. 12, 1933, of a bullet wound inflicted by a patient.

Lyman C. Broughton, Castile, N. Y.; University of Buffalo School of Medicine, 1889; member of the Medical Society of the State of New York; for many years county coroner; health officer of Castile and Genesee Falls; aged 65; died, Nov. 19, 1933, in the Wyoming County Community Hospital, Warsaw, of arteriosclerotic heart disease.

William Edward Denning, Worcester, Mass.; University of Vermont College of Medicine, Burlington, 1899; member of the Massachusetts Medical Society; fellow of the American College of Surgeons; served during the World War; formerly on the staff of the Worcester City Hospital; aged 61; died, Dec. 7, 1933, of heart disease.

William Leslie Munson ✱ Granville, N. Y.; Albany Medical College, 1908; served during the World War; district state health officer, state department of health; for many years president of the board of education of Granville; on the staff of the Glens Falls (N. Y.) Hospital; aged 48; died, Dec. 2, 1933, of pneumonia.

Frank Crawford Story, Marion, Ind.; University of Georgia Medical Department, Augusta, 1926; on the staff of the Veterans' Administration Facility; formerly county health commissioner of Jenkins and Wayne County, Georgia; aged 37; died, Oct. 30, 1933, in a hospital at Indianapolis, of retroperitoneal carcinoma.

Oliver P. Terry ✱ West Lafayette, Ind.; St. Louis University School of Medicine, 1906; medical adviser, with rank of professor in the department of biology, Purdue University; aged 51; on the staff of St. Elizabeth's Hospital, Lafayette, where he died, Dec. 6, 1933, following an operation for duodenal ulcer.

Francis Calistus O'Neill, Philadelphia; University of Pennsylvania School of Medicine, Philadelphia, 1911; member of the Medical Society of the State of Pennsylvania; aged 52; on the staffs of St. Christopher's Hospital for Children and St. Agnes' Hospital, where he died, Dec. 8, 1933.

Burpee L. Steeves, Salem, Ore.; Willamette University Medical Department, Salem, 1894; past president of the Oregon State Medical Society; fellow of the American College of

✱ Indicates "Fellow" of the American Medical Association.

Surgeons; formerly mayor of Salem and lieutenant governor of the state; aged 65; died, Oct. 23, 1933.

Frank R. Moore, Florence, Colo.; Columbus (Ohio) Medical College, 1885; member of the Colorado State Medical Society; past president of the Fremont County Medical Society; health officer of Florence; aged 69; died suddenly, Nov. 27, 1933, of heart disease.

Frederick William Knoll ✱ Reading, Pa.; Jefferson Medical College of Philadelphia, 1914; served during the World War; on the staff of St. Joseph's Hospital; aged 47; died, Nov. 29, 1933, of hypertension, nephritis, cerebral sclerosis and heart disease.

Herbert M. Klein ✱ New York; Cornell University Medical College, New York, 1928; aged 30; died, Nov. 26, 1933, in the Massachusetts General Hospital, Boston, of pulmonary embolus, following an operation for fusion of the vertebrae.

Ray Russell Hetherington, Pittsburgh; University of Pennsylvania School of Medicine, Philadelphia, 1916; member of the Medical Society of the State of Pennsylvania; served during the World War; aged 42; died, Oct. 22, 1933, of coronary sclerosis.

Rufus D. Boss ✱ Wacousta, Mich.; Columbian University Medical Department, Washington, D. C., 1891; past president of the Clinton County Medical Society; on the staff of the Clinton Memorial Hospital, St. Johns; aged 71; died, Dec. 4, 1933.

Ralph Evans Runkle, Oklahoma City; Barnes Medical College, St. Louis, 1899; member of the Oklahoma State Medical Association; aged 55; died, Nov. 23, 1933, in the Oklahoma City General Hospital, of bronchopneumonia.

Louis Eugene Barlow, Philadelphia; Jefferson Medical College of Philadelphia, 1896; member of the Medical Society of the State of Pennsylvania; aged 67; died, Dec. 8, 1933, in the Frankford Hospital, of heart disease.

Patrick Henry Whalen, Buffalo; University of Buffalo School of Medicine, 1906; member of the Medical Society of the State of New York; aged 48; died, Dec. 12, 1933, of cerebral hemorrhage and hypertension.

William Louis Rost ✱ New York; Long Island College Hospital, Brooklyn, 1909; on the staff of the Morrisania City Hospital; aged 51; died, Dec. 4, 1933, in the Mount Sinai Hospital, of malignant hypertension.

John T. Shelland, Ada, Minn.; Medical Department of Hamline University, Minneapolis, 1900; member of the Minnesota State Medical Association; aged 61; died suddenly, in November, 1933, of heart disease.

Abraham Jacob Sumner ✱ Brooklyn; Columbia University College of Physicians and Surgeons, New York, 1906; on the staff of the Beth Moses Hospital; aged 48; died suddenly, Dec. 2, 1933, of heart disease.

William Nicol Stein ✱ Shenandoah, Pa.; University of Pennsylvania School of Medicine, Philadelphia, 1894; aged 63; on the staff of the Locust Mountain Hospital, where he died, Nov. 23, 1933, of pneumonia.

Joseph Armour Wade, Fredericton, N. B., Canada; Medical School of Maine, Portland, 1877; first medical officer for the western health district of the province of New Brunswick; aged 84; died, Oct. 21, 1933.

Leopold Heimann ✱ Evansville, Ind.; University of Louisville (Ky.) School of Medicine, 1904; aged 51; for many years on the staff of St. Mary's Hospital, where he died, Dec. 7, 1933, of cerebral hemorrhage.

Daniel Webster Sullivan, Passaic, N. J.; University of Vermont College of Medicine, Burlington, 1896; aged 64; died, Nov. 28, 1933, of heart disease, Parkinson syndrome and chronic arthritis deformans.

Joseph N. Kiefer, Buffalo; University of Buffalo School of Medicine, 1906; member of the Medical Society of the State of New York; aged 52; died, Dec. 15, 1933, of septicemia and heart disease.

Samuel Steele, Chanute, Kan.; Kansas City (Mo.) Medical College, 1896; aged 63; died, Nov. 18, 1933, in the Research Hospital, Kansas City, Mo., of arteriosclerotic cardiovascular renal disease.

Joseph A. Oliver, San Francisco; University of California Medical Department, 1889; member of the California Medical Association; aged 71; died, Oct. 17, 1933, of arteriosclerosis.

Joseph Marzano, Chicago; Loyola University School of Medicine, Chicago, 1931; member of the Illinois State Medical Society; aged 25; died, Dec. 21, 1933, of pneumonia.

Alfred Charles Nicholas Peterson, Worcester, Mass.; University of Pennsylvania School of Medicine, Philadelphia, 1897; aged 65; died, Nov. 6, 1933, of arteriosclerosis.

Phreeborn Grundy Paugh, St. Louis; Marion-Sims College of Medicine, St. Louis, 1899; served during the World War; aged 62; died, Nov. 24, 1933, of heart disease.

Carl W. Kimery, Lerna, Ill.; Barnes Medical College, St. Louis, 1898; aged 64; died, Nov. 24, 1933, in the State Hospital, Jacksonville, of carcinoma of the liver.

Jesse Edgington, Hood River, Ore.; Kentucky School of Medicine, Louisville, 1879; formerly county health officer; aged 84; died, Nov. 15, 1933, of chronic myocarditis.

James McConnell Hubbard, Hickman, Ky.; Missouri Medical College, St. Louis, 1886; formerly county health officer; aged 70; died, Nov. 29, 1933, of heart disease.

Thomas Byron Kea, Adrian, Ga.; Atlanta (Ga.) Medical College, 1915; member of the Medical Association of Georgia; aged 54; died, Dec. 5, 1933, of heart disease.

August Henry Malm, Princeton, Ill.; Barnes Medical College, St. Louis, 1895; since 1904 county coroner; aged 64; was found dead, Dec. 4, 1933, of heart disease.

Horace H. Prefontaine, South Durham, Que., Canada; Laval University Medical Faculty, Montreal, 1890; aged 68; died, Oct. 12, 1933, of heart disease.

Sheridan P. Manship, Philadelphia; University of Pennsylvania School of Medicine, Philadelphia, 1890; aged 65; died, Dec. 14, 1933, of acute nephritis.

Alfred G. Smith, Philadelphia; Hahnemann Medical College and Hospital of Philadelphia, 1900; aged 54; died, Nov. 27, 1933, of chronic myocarditis.

William Lawrence Dunn, Oakland, Calif.; University of California Medical Department, 1897; aged 58; was found dead, Nov. 24, 1933, of heart disease.

Thomas Simpson Pryse, Dawson, N. D.; University of Louisville (Ky.) School of Medicine, 1894; aged 61; died, in October, 1933, of heart disease.

Ninian Wildridge Woods, Bayfield, Ont., Canada; L.R.C.P., Ireland, 1887; M.R.C.S., England, 1887; postmaster; aged 73; died, Oct. 31, 1933.

Raymond Wallace Anderson, New Hamburg, Ont., Canada; University of Toronto Faculty of Medicine, 1904; aged 50; died, Sept. 30, 1933.

Joseph D. McCarter, Beaver Falls, Pa.; Jefferson Medical College of Philadelphia, 1883; aged 77; died in December, 1933, of cerebral hemorrhage.

Benjamin H. Kirk, Union Star, Mo. (licensed, Missouri, 1884); Civil War veteran; aged 91; died, Nov. 20, 1933, of pulmonary emphysema.

Albert Habermaas ✱ St. Louis; Marion-Sims College of Medicine, St. Louis, 1896; aged 61; died, Nov. 20, 1933, of cerebral hemorrhage.

Harry Wishart Keith, Enderby, B. C., Canada; McGill University Faculty of Medicine, Montreal, Que., 1896; aged 60; died, Oct. 22, 1933.

John Shelby Moremen, Louisville, Ky.; Kentucky School of Medicine, Louisville, 1890; aged 68; died, Nov. 30, 1933, of angina pectoris.

James B. McPike, Smileyville, Mo.; College of Physicians and Surgeons, Keokuk, Iowa, 1879; aged 76; was found dead, Nov. 19, 1933.

Joseph Thomas Poock, Hoboken, N. J.; Baltimore Medical College, 1890; aged 73; died, Nov. 13, 1933, in St. Mary's Hospital.

Samuel Henry Ward, Los Angeles; Chicago Homeopathic Medical College, 1896; aged 59; died, Oct. 29, 1933, of angina pectoris.

A. P. Massengill, Halls, Tenn.; Memphis Hospital Medical College, 1907; aged 61; died, Nov. 29, 1933, of heart disease.

Charles R. Long, Pierceton, Ind.; Detroit Medical College, 1880; aged 82; died, Nov. 23, 1933, of cerebral hemorrhage.

Daniel J. Halbrook, Formosa, Ark. (licensed in Arkansas in 1903); aged 61; died, Nov. 28, 1933, of heart disease.

Chambers J. Penn, Piketon, Ohio (licensed, in Ohio in 1896); aged 81; died, Nov. 21, 1933, of heart disease.

Edward Pearce, Marshall, Ill.; Chicago Medical College, 1878; aged 83; died, Nov. 21, 1933, of arteriosclerosis.

Charles M. Oughton, Evanston, Ill.; Rush Medical College, Chicago, 1884; aged 71; died, Dec. 8, 1933.

Josephus W. Benadom, Monticello, Iowa (licensed, Iowa, 1887); aged 90; died, Dec. 5, 1933.

Bureau of Investigation

MICRO-DYNAMICS

One of the Outgrowths of the Electronic Reactions of Abrams

Every physician who has practiced for ten years or more remembers the gigantic piece of pseudo-scientific hokum that was brought into existence by the most polished charlatan of the century, Albert Abrams. This man and the followers of the cult that he developed claimed that it was possible, by means of some pieces of electrical hocus-pocus that Abrams put on the market and leased at a high price, to diagnose from a drop of dried blood, or even from the autograph of a person, the ailment from which that person was suffering. Then, the diagnosis having been made, the patient was switched on to another Abrams machine to cure the condition by alleged vibrations. Disciples of the cult reaped a golden harvest diagnosing disease where it did not exist and then charging the victims a round price for curing the non-existent ailment. Abrams named his cult the "Electronic Reactions of Abrams," shortened for commercial purposes to "E. R. A."

Now there is being pushed to the medical profession a device that, if the exploiters are to be credited, is still more marvelous than any of the wonders called from the vasty deep by Abrams. It is called the "Micro-Dynameter" and is put out by a concern known first as the Electronic Research Laboratories and now as the Ellis Research Laboratories, Inc. The man back of the concern seems to be Mr. F. C. Ellis, who claims to be a graduate of the University of Wisconsin, Electrical Engineering, of the Kansas State College, General Science, and of the Finlay Engineering College. He has described himself as a consulting engineer. The only information regarding Mr. Ellis' abilities in the electrical field of which we have any evidence is the fact that in 1925 his name headed a committee of three which declared that it had examined the "Tricho" apparatus and concluded that all of the necessary precautions have been taken in its construction to safeguard . . . the patient from . . . exposure to undesirable rays." Physicians will remember that the Tricho device—an X-ray machine for depilation and one of the most viciously dangerous pieces of apparatus ever put into the hands of beauty-parlor operators—has been responsible for innumerable cases of X-ray burns, atrophies, telangiectases, ulcers, and, in some cases, cancer.

The Bureau of Investigation has made no examination of the mechanics of the Micro-Dynameter. This article will be confined to a discussion of the background on which the device is projected, and of the claims made for it. There is a tendency on the part of the medically untrained to assume that whenever a fantastic piece of pseudo-medical apparatus whose use is predicated on a preposterous theory is commercially exploited, it becomes the duty of the organized medical profession to check and recheck such apparatus by technical means to determine whether or not the claims made for it are true. The facts are, of course, that in all such cases the burden of proof lies with the man or concern that is making money by promulgating the theory and exploiting the machine. Surely no one would hold that the American Astronomical Society would be under obligation to carry out extensive spectroscopic investigations to disprove the claim that the moon is made of green cheese. No sensible person believes that it is incumbent on the medical profession to carry out a series of experiments to prove or disprove the belief, widely held by some, that the left hind foot of a rabbit caught in a churchyard in the dark of the moon is a therapeutic agent of potency and respectability.

THE BACKGROUND

In 1923 Mr. Ellis' concern was known as the Electronic Research Laboratories; it claimed to make "precision instruments for the diagnosis and treatment of disease." At the time Mr. Ellis was putting out *Bulletin No 1* entitled "Report on 'Electronic' Diagnosis and Treatment of Disease." In the opening pages of this report he stated:

"Science is just entering the field of vibrations."

"Each form of diseased matter, in common with other forms of matter, has its own characteristic vibratory rate and gives off energy of individual wave form."

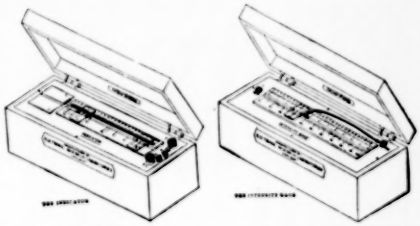
"When a healthy person is properly connected by wires to a certain device containing a drop of blood extracted from a diseased patient, then, under certain conditions, definite physiological effects are produced upon the abdomen of that person. This is a readily demonstrable fact. These manifestations . . . are the product of the action of disease emanations from the blood sample."

There was much more of the same tenor, with tables and graphs, all mysterious and impressive. On the well-known thesis that the unintelligible appeals to the unintelligent, the bulletin doubtless impressed a certain class. The sum and substance of Mr. Ellis' *Bulletin No. 1* seemed to be that Albert Abrams' theories were all right, but his practical applications were rather crude. Mr. Ellis closed the *Bulletin* with certain conclusions, the first of which was:

"The existence, in diseased blood, of radiant energy of wave-like character has been established."

Other conclusions were to the effect that the Abrams theories of cure had been disproved, but Mr. Ellis had enunciated the correct theory; that the defects in the Abrams apparatus for electronic diagnosis and treatment had been revealed, but that Mr. Ellis had developed superior apparatus.

The L. D. Rogers Testimony.—This, it will be remembered, was in 1923. In September, 1924, Mr. Ellis sent out on his own stationery as "consulting engineer" a mimeographed "release" to editors describing the alleged work of Dr. L. D. Rogers "in measuring the cancer wave," which, according to Mr. Ellis, "lies in a new band of radio frequencies." L. D.



Two of Mr. Ellis' diagnostic instruments—the "Indicator" and the "Intensity Gage."

Rogers will be remembered by many readers of this department of THE JOURNAL as the exploiter of "Auto-Hemic Serum," as the one-time dean of the National Medical University, a "sun-down" institution of ill repute, as the advertiser of an alleged Japanese treatment for tuberculosis, etc. Mr. Ellis assured the editors that, according to Rogers' findings, "cancer acts as a miniature broadcasting station." Let us quote from one paragraph of the story:

"In the test Dr. Rogers used as a subject a woman about 45 years of age. Says Dr. Rogers, 'I tried out different samples of her blood at different times—during every test we got most pronounced cancer wave radiations. On one occasion we took the sample of blood to Mr. Ellis, inventor of the delicate indicator used in this test. Without any suggestion of any kind as to the nature of the wave length, he measured it correctly as cancer and also located it in the right breast.'"

Substitute the name of "Albert Abrams" for that of "Mr. Ellis" in the quotation just given, and it might have been taken almost direct from the old Abrams ballyhoo.

"Feeding the Sick Atom."—In 1924, also, Mr. Ellis was sending out a little pamphlet, obviously intended for the general public, entitled "Feeding the Sick Atom in Disease." The opening paragraph under the chapter heading "Health and Disease Waves" stated that the booklet was "an account of a new and remarkable method of protecting and combating disease in sick people." It went on to elaborate by stating that "man is an electrical machine made up of tiny batteries" and that when "the batteries in the human plant" run down, it produces the condition we call disease. Then:

"To overcome such a condition, the batteries of the body need recharging, and this may be done in a simple manner."

Mr. Ellis then dwelt on the improved apparatus that he had devised for electronic diagnosis; thus:

"When a healthy human being (Detector) is properly connected to a device called an Indicator containing a drop or so of diseased blood from a patient, the disease waves can be tuned into."

On another page of the same booklet an electronic "treatment" with an Ellis machine was described. It was stated that in taking the treatment the patient sits comfortably in a chair with his feet on a metallic plate while electrodes are either held in the hands or applied to certain parts of the body. Wires leading from the treatment apparatus were said to "carry a flow of the elements which are needed by the patient and which have been liberated through the destruction of a metal by incandescence and applied under proper low potentials to the patient." It was emphasized that this Ellis treatment was a very different thing from what the public usually considered "electrical treatment" and that no current could be felt.

"However, a pleasant sensation of warmth beginning at the extremities and gradually pervading the whole body is usually experienced, and this is accompanied by an unmistakable increase in vigor and mental clarity and a 'getting well' feeling which builds up and carries the patient forward to health from the first treatment."

The "Indicator" (on the left) and "Intensity Gage" (on the right) in use in making a diagnosis from a drop of blood. This picture, according to Mr. Ellis, is one "illustrating a convenient set-up for diagnosis." The drop of blood (on paper) is put on the far end of the Indicator, which is connected at one end with an electrode held to the forehead of the "Detector" (a healthy subject) and at the other end with the Intensity Gage, which, in turn, is connected to a metallic plate on which the Detector stands. By percussing the abdomen of the Detector, the physician acquainted with the mysteries of Micro-Dynamics determines the pathologic state of the patient from whom the drop of blood was taken.

The booklet then went on to explain that Albert Abrams was the originator of electronic diagnosis and treatment, but that as he was "primarily a physician, not a physicist," his apparatus was admittedly rather crude. It was a logical sequence, it continued, that expert physicists—such as Mr. Ellis—should be turned loose on the problem. This was done, with the result that instruments of greater refinement and giving a "fuller measure of success in diagnosis and treatment" had been brought about. Then comes in the closing paragraphs the admission that these new instruments, "the result of a long and scientific research," had been developed by the Electronic Research Laboratories!

The "Indicator" and "Intensity Gage."—In 1924 Mr. Ellis already had some of these "new instruments" on the market. One was known as the "Indicator." Its function was to fix "as stationary electrical waves" the "electronic emanation from matter such as diseased blood." Another device was the "Intensity Gage." The two instruments sold for $300.00; the "Treatment Apparatus" was $350.00. The Intensity Gage, we were told, unlike the Indicator, which measured "the length or base of an electronic wave," was used "for the purpose of measuring the amplitude of such a wave." These two devices, the Indicator and the Intensity Gage, seemed to be used in much the same way that Abrams used his diagnostic mystery boxes. In use, a healthy subject, known as the "Detector," stood on a metallic foot plate that was connected by wire to the Indicator. The Indicator was connected by wire to the Intensity Gage. The Intensity Gage was connected by wire to an electrode which the healthy subject (Detector) held against his forehead while his abdomen was percussed and the "diagnosis" made!

The Seven Basic Diseases.—At this stage of Mr. Ellis' investigations he had expressed the opinion that there were seven definite "disease emanations" whose "frequencies" lay "between the limits 37,500,000,000 and 150,000,000,000 cycles per second." Probably realizing from Abrams' experience the possibility of being laughed out of court if he attempted to name his seven fundamental disease forms, Mr. Ellis expressed the opinion that "the naming of individual wave forms indigenous to diseased blood is unsatisfactory." But the patient who had to pay the bill for a "diagnosis" might be expected to demand information less ethereal than the statement that he was suffering from electronic vibrations whose frequencies were, let us say, 55,343,000,000 cycles per second. To meet this, pragmatically, Mr. Ellis suggested—in a pamphlet devoted to "Operating Instructions" of his "Indicator" and "Intensity Gage"—that "of course it may be necessary from the patient's standpoint to give diagnostic findings in terms of the common disease names." He therefore gave the following tabulation of the seven "basis diseases":

HALF WAVE LENGTH	DISEASE	SETTINGS OF INDICATOR SLIDE "L"	SLIDE "R"
1	Gonorrhea	1	1
2½	Sarcoma	2½	2½
3	Carcinoma	3	3
4	Congenital Syphilis	4	4
5	Acquired Syphilis	5	5
7	Streptococcus	7	7
8	Tuberculosis	8	8

How reminiscent this is of Abrams. He it was who reported finding carcinoma, syphilis and many other serious conditions in patients in whom ordinary M.D.'s could find no organic trouble. In fact, diagnosing syphilis in certain husbands and wives who were quite free from that disease brought Abrams legal grief. As a result, he suggested to the followers of his cult that they substitute for what he had been calling congenital or acquired syphilis the euphemism "Congenital or Acquired Diminished Resistance."

Selecting Diet by Radio.—By 1925 Mr. Ellis had extended his field of operations: He had brought out a "Food and Remedy Test Set"—price $85.00. This was, as Mr. Ellis advertised, to make it possible for patients to have their "Remedies and Diet Selected by Radio." The Food and Remedy Test Set was a shallow case or box containing between two and three hundred short metal cylinders standing vertically. Small glass vials slipped loosely into the cylinders. The food, condiment, "tissue salt," "protein or pollen," beverage or "drug or serum" to be tested "by radio" was placed in a vial which was put into one of the metal cylinders ("and so is shielded from all other specimens"), then a hollow electrode which would fit into the metal cylinder was put in position over the vial and the electrode was connected with Mr. Ellis' "Indicator." This, in turn, was connected by wire with Mr. Ellis' Intensity Gage, which also, in turn, was connected by wire with the person ("Detector") who was standing on a metal plate holding the electrode from the Intensity Gage to his forehead while the Ellis disciple percussed the abdomen of the "Detector" and thus solved the mystery of the food, "tissue salt," "drug or serum," etc.

In 1926 Mr. Ellis was advertising a "Laboratory Service" and sending physicians a mimeographed letter with which was included a buff envelope bearing the name and address of the "Electronic Research Laboratories" with the statement printed on it: "Specimen of Human Blood Submitted for Electronic Examination by Dr. ———." In the buff envelope was a black envelope (presumably to keep out any stray radio waves) and in it was a piece of white "test" paper on which the blood

specimen was to be put and then the whole mailed to Mr. Ellis. The mimeographed letter gave the explanation of the "test" services offered:

"(1) *The Disease Test* includes determination of radiations from diseased blood specimens associated with basic diseases such as Carcinoma, Syphilis, Tuberculosis, Streptococci infections, Gonorrhea, Sarcoma and others if indicated, in accordance with the well known methods published by these Laboratories and previous calibrations of the Ellis Precision instruments from known disease sources. As has been demonstrated, these are the most sensitive present methods for this work.

"(2) *The Food and Remedy Selection Test* includes a determination of (a) What substances such as foods, stimulants, chemicals, etc., used by a patient are *incompatible* and act to *increase* the disease energies in his blood, and (b) What substances contain elements needed by the patient which will reduce or *nullify* his disease energies as indicated in the blood radiation analysis."

Cow Curing.—In 1926, also, Mr. Ellis was describing how tuberculous cattle were being diagnosed and cured with his machine. One sick "bossy" was diagnosed on June 26 as "Tuberculosis, 100%; streptococci infection, 51%." She was given Ellis' treatments and then on July 7 again put on the diagnosis machine. This, we are told, recorded: "Tuberculosis, 0; strep. 8½." The report closes with the statement: "On July 8 another abscess broke and pus exuded from eyes and nose; cleared away; appetite voracious."

About this time, too, Mr. Ellis seems to have named his "Treatment" machine the "Raydion." He also combined an "Indicator," an "Intensity Gage" and a "Food and Remedy Test" into one unit and christened it the "Quantometer." In addition, he advertised a line of dehydrated food products with a *Bulletin* (No. 19-B) detailing the virtues of certain foods, thus:

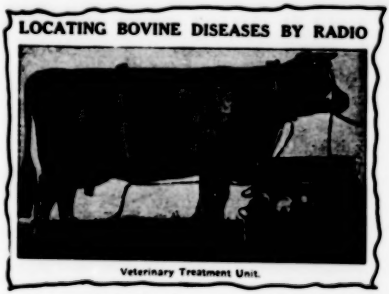
"Peaches.—Eliminate bile and poison in the kidneys."
"Yellow Turnip.—Very cooling to the nerve and brain centers."
"Mushrooms.—Nerve and brain food."
"Irish Moss.—Has remarkable value in the elimination and dissolving of goiter and is a natural food for the restoration of hair to its natural color and in promoting the growth of the same."

Mr. Ellis' "Food and Remedy Test Set." According to Micro-Dynamics: "Certain drugs, chemicals, vaccines, medicines, foods and other substances have been found to radiate energies similar in intensity to those of disease sources and to have wave lengths which are similar or close multiples thereof and which will cause abdominal reactions similar to those of disease."

Mr. Ellis, in a "Technical Number" of one of his *Bulletins*, declared that the effects of treatment by his machine, the "Raydion," had been observed with the ultra-microscope by watching "the dispersion and movement of the protein particles in the blood."

"When these particles lose their electric charge, they coagulate and precipitate in and clog the capillaries and produce degenerative processes of disease. Following treatment on the Raydion the protein particles have been observed to be dispersed again due to restoration of normal electric charge—replacement of missing electrons on the particles."

It was about this time that Mr. Ellis began to quote McDonagh and his theory. Dr. McDonagh of London, England, has established what bids fair to become a cult. It appears from the intricate and involved theories that he has built up around a private nomenclature, that Dr. McDonagh holds that practically all pathologic and therapeutic action consists in changes of the condition of the colloids—mainly proteins—of the body, which, he claims, in health are in an optimum state of dispersion. Hence his slogan: "There is



In 1922 Mr. Ellis even invaded the veterinary field. Here is shown a cow being tested for tuberculosis.

only one disease"—namely, a change of the condition of the colloids. So far as we know, Dr. McDonagh is quite unaware of Mr. Ellis and his mechanical apparatus for diagnosing and treating disease. In fact Dr. McDonagh apparently is interested in the prescribing of certain proprietary remedies of secret composition known by such peculiar names as "S.U.P. 36," "S.U.M. 36," "Antrypol," etc. Apparently the one angle of McDonagh's theories that is of particular interest to Mr. Ellis is that McDonagh has reduced all disease from seven basic pathologic states to one.

MICRO-DYNAMETER

The apparatus that Mr. Ellis is exploiting at the present time, is a great improvement, of course, on the Indicator, Intensity Gage, Food and Remedy Test Set, Radion, Quantometer, etc. It is known as the Micro-Dynameter and as Mr. Ellis points out, has "an unusually impressive appearance." The advantage of the latest piece of apparatus to come from the Ellis Research Laboratories is that it apparently makes the diagnosis and treatment of disease purely mechanical. No longer is there any need of the healthy subject ("Detector") having to stand on a metallic plate and have his abdomen percussed in order to learn what disease emanations there are in a blood specimen or the nature of the vibrations there may be in a vial of spinach.

Now the entire problem has been reduced to its lowest common denominator. Mr. Ellis describes his Micro-Dynameter as a "New Mechanical Detector for Diagnosis and Precision Therapeutic Generator." The essential part of the Micro-Dynameter, so far as the physician who is supposed to use it is concerned, is the "Detector Scale," which is a little over a foot wide, has a zero mark in the center, and ranges from 150 points on either side of zero, negative to the left and positive to the right. Readings are said to be made by means of a spot of light casting a vertical narrow shadow which travels along the scale "under the impulse of minute electric currents generated by a patient's body." Each of the 150 divisions, both negative and positive, are said to be adjustable up to 1,000 units. The normal human body, instead of registering zero on the scale, is said to register 50 or, in Mr. Ellis' figures, 50,000 to the right (positive) of zero; as he puts it: "This is the zone of Health and maximum Vitality." The range to the left, from 50,000 to zero, is said to take in most of the "chronics," while in the range to the right, 50,000 to 150,000, come the "acute" cases.

In making a diagnosis, the patient is attached to the Micro-Dynameter by two electrodes, one a metallic plate on which he stands in his bare feet, the other a metallic rod that he holds in his hands. Then the current is turned on and a narrow black line should appear at zero. Another switch is thrown and the line begins to move slowly and it comes to rest on a certain mark to the right of the zero point, "*which your patient can see and understand.*" This, according to Mr. Ellis, is said to reveal "in one single reading the summation of all disease factors going back to those of heredity." Or, to put it in Mr. Ellis' own modest phrase, expressed in black-faced type, the Micro-Dynameter is "the first true therapeutic gage in history" and "a perfected scientific mechanical detector for diagnosis."

Mr. Ellis then lists a number of "diseases"—as they are quaintly called by ordinary physicians—and the markings that are shown on the Detector Scale of the Micro-Dynameter correspond to these diseases. Thus:

Advanced Diabetes with Obesity	3,000
Heat prostration, extreme exhaustion	4,000
Cancer	9,000
Melancholia, high blood pressure	12,000
Tuberculosis	15,000
Apoplexy	16,000
Neurotic	17,000
Asthma	18,000
Nervous breakdown	22,000
Anaemia	27,000
Sacro-Iliac strain	33,000
HEALTH	50,000
Deafness, cataract	59,000
Syphilis	77,000
Acute Gonorrhea	91,000
Acidosis	122,000
Insanity	141,000

From this presumably incomplete table, it will be seen that good health lies somewhere between a sacro-iliac strain and deafness and cataract. It appears, further, from Mr. Ellis' book that a patient's "polarity"—determined by the Micro-Dynameter in connection with another of Mr. Ellis' devices, the "Polarimeter" may depend to some extent on where he lives. We read, for example:

> "In New York a large group of people measured positive in every single case and no two were alike, variations ranging from 3 divisions up to 1800 divisions to the right of '0.' In Chicago the proportion is very close to two positives to one negative and likewise wide differences between the degree of displacement from '0' between individuals. In Des Moines, Iowa, a group split exactly even between positive and negative."

From this it would appear that Des Moines, Iowa, would be the ideal place to live, were it not for the further fact that Mr. Ellis says that "this factor is influenced by the seasons and the weather."

Another chapter in Mr. Ellis' book on Micro-Dynamics deals with the localization of disease after it has been diagnosed. Mr. Ellis would like to resolve all diseases into one or, as he puts it, "the reduction of all diseases to simple unity would constitute the greatest scientific classic." But he admits that this is "just now relatively a big step to take." In fact, he thinks that "the proposal is probably 25 years or more ahead of the world," because "the patient still demands to know the name of his ailment." Mr. Ellis still thinks, though, it would be far better for everybody concerned if one could reduce the thing to two terms, Health and Disease, and instead of trying to find *what* a person has, determine *where* he has it.

Mr. Ellis claims for the Micro-Dynameter the following advantages over the older instruments:

> "1. A complete examination which formerly might have required an hour can be made, by this new method, in from 5 to 10 minutes.
>
> "2. The efficiency of detection is increased from 5% to approximately 100% due to the fact that the human element is ruled out completely, and the detections are made by means of the sense of sight instead of the unreliable senses of touch or hearing.
>
> "3. Technique is utterly simple due to the automatic working of the instrument.
>
> "4. More confidence on the part of the patient is assured by the visual readings, which *the patient may also read and understand.* [Italics ours.—Ed.] by reason of correlation with his symptoms and experience."

Mr. Ellis does, it is true, throw in as a suggestion that after this 100 per cent efficient diagnosis has been made, "physical examination may be employed to verify these findings." One wonders why.

The Micro-Dynameter is also used in the treatment of disease. It is, in fact, "a Precision Therapeutic Generator." After the instrument has been used to make the test of "vitality" and then the patient's "polarity" is measured, "the calculation of the treatment is made with the aid of a blue print of curves, which are calibrations of the instrument." A picture is given showing a patient with hepatic insufficiency receiving treatment from a Micro-Dynameter. The patient grasps one electrode with both hands, a flat electrode is placed over his liver, and his feet are contacted with a foot plate. The current is turned on and the hepatic insufficiency disappears?

The Micro-Dynameter is also recommended as having "particular application to the problem of Special Analysis" and, as such, will doubtless interest osteopaths and even chiropractors, for it is said to record spinal subluxations.

This story has been a long one, but it has been necessary in order that the medical profession may have a clear understanding of the background, medical and otherwise, on which Micro-Dynamics is predicated. Mr. Ellis has, in a pamphlet recently issued attacking the American Medical Association, taken considerable umbrage over the fact that the Bureau of Investigation of the American Medical Association, in answering inquiries about Micro-Dynamics, has stated that it knew of no evidence from scientifically respectable sources to sustain the claims made for the Micro-Dynameter. As indicative of

This is Mr. Ellis' "Chart No. 1, "localizing certain diseases—mainly in the A's, B's and C's—by means of the diagnostic set-up already illustrated. This chart is reminiscent of the ones put out by Albert Abrams.

Mr. Ellis' tactics, he reproduces in his booklet a letter which a chiropractor wrote to the Bureau of Investigation about the Micro-Dynameter. The Bureau of Investigation answered the letter briefly, as follows:

> "*Dear Sir:*—In our opinion, there is not a scintilla of evidence from scientifically respectable sources to sustain the fantastic claims made for the Ellis Micro-Dynameter."

Mr. Ellis publishes the chiropractor's letter and the Bureau of Investigation's reply, and in a comment implies that he is surprised that the Bureau of Investigation should stand ready to serve a chiropractor. The Bureau of Investigation answers inquiries from all laymen—the butcher, the baker and the candlestick maker. It has given information concerning

nostrums and quackeries on a few occasions to chiropractors. The Bureau, however, has never found it necessary to employ a chiropractor to write a decoy letter.

The peculiar theories and still more peculiar device of Mr. Ellis would probably never have become of sufficient importance to warrant a detailed description of them had it not been for the fact that Mr. Ellis' device has been given a quasi-respectability by having been exhibited at the convention of the Inter-State Postgraduate Medical Assembly at Cleveland. The further fact that Mr. Ellis' device is advertised in *Clinical Medicine and Surgery* may also mean much to him, but the profession is fairly well aware of the fact that this particular journal carries advertisements of many dubious products.

While Micro-Dynamics is essentially a further extension of the preposterous theories of Albert Abrams, there is this difference: Albert Abrams was a physician and a charlatan; his devices were electrically and mechanically crude to a degree. Mr. Ellis is merely an electrical engineer without medical knowledge or training who apparently believes that he has reduced the diagnosis and treatment of disease to the simplicity of a nickel-in-the-slot gum-vending machine. The ability to sell such fantastic devices as Perkins' Tractors, the Abrams machine and the Micro-Dynameter are actually a much greater indictment of that part of the medical profession that buys them than they are of the individuals whose names these devices bear.

Correspondence

ULCERATIVE COLITIS

To the Editor:—Recently two articles on chronic ulcerative colitis have appeared in THE JOURNAL. The former of the two was written by us (November 4, p. 1462); the latter, by Dr. Moses Paulson (November 25, p. 1687).

The altercation between Dr. Paulson and us is well known to those who are interested in gastro-enterology. To say that the dispute is of no importance to us personally would be to assume an indifference which we do not feel. Nevertheless, we forbore to mention it in our article, for it is not absorbing to those who are not specialists in the field concerned, and it might well result in disservice to the sick. Here we carry the controversy no further than to refer those who are interested to our published work. Such readers will be able to judge whether Dr. Paulson's partial direct quotations and his indirect quotations of us have always been of sufficient length to give an accurate impression of what we have stated and done.

The reason for this note is only that we believe the destructive character of Dr. Paulson's paper might result in leading some physicians, who see only an occasional case of ulcerative colitis, to believe that no aid can be given. We have demonstrated the contrary.

We published the report of our work as soon as we thought we had ascertained something that would be of value at the bedside. Of the fact that we have modified our ideas as we gained more knowledge we are proud rather than apologetic. Dr. Paulson is correct in saying that etiology must not be confused with therapy. We have not so confused them. We have recognized that gaps might exist in our concepts of etiology, and in attempts to fill these gaps we have extended our studies into all manner of intestinal ulceration. But we have applied what we knew, and have followed our patients sufficiently long to be sure of our results. These results have engendered in our minds nothing of the despair to which Dr. Paulson confesses.

J. A. BARGEN, M.D.,
LOUIS A. BUIE, M.D.,
Rochester, Minn.

DIAGNOSIS OF AMEBIASIS

To the Editor:—In reference to the diagnosis of amebic dysentery, as outlined in the article by Dr. Kano Ikeda of St. Paul in the Dec. 16, 1933, issue of THE JOURNAL, I venture to state that his conclusions regarding the laboratory diagnosis are not borne out by the experiences of those who have had an opportunity to study the intestinal amebas of man.

He says: "While, therefore, I follow the teaching of the authorities that the finding of red blood cells within the vegetative form of amebas and the demonstration of the four nucleated cysts should constitute the final diagnostic criteria of Endamoeba histolytica, I feel that, in experienced hands, a positive diagnosis, without either of the two, may be justified, at least in the face of an outbreak such as has been witnessed."

In the first place, the finding of the vegetative form is not easy unless one can procure the specimens directly from the ulcerations through proctoscopic examination. Secondly, the differential diagnosis of the vegetative form of Endamoeba histolytica and Endamoeba coli is not easy. Possibly the finding of the red cells within the cytoplasm in the case of the former, and the finding of foreign bodies, bacteria, and so on, in the case of Endamoeba coli, are good diagnostic differential points, but, after all is said and done, the true diagnosis of this disease must be made by finding the cystic forms. Differences between the cysts of histolytica and coli are very striking. I have found in this country that but few laboratory workers are performing routine examination of stools for the demonstration of the cystic forms by staining methods. Thirdly, it is manifestly unscientific and unwarranted to make a diagnosis simply because we are facing an outbreak of supposed amebic dysentery in certain communities. On the face of it, this is very poor advice to be given by the laboratory to the general profession.

In my studies at the Hamburg Institute of Tropical Medicine under Professor Reichenow, it was emphasized that the finding of cysts was the only true criterion for the laboratory diagnosis of this disease. It should be used as a routine method in all laboratories.

It is imperative that in stool examinations a routine staining process be carried out in all suspected cases of amebic dysentery. Once the observer becomes acquainted with the characteristics of the cysts of these two forms, no great difficulty occurs in making a laboratory diagnosis.

The staining method is as follows:

1. Fix in a mixture of 2 parts of saturated aqueous solution of corrosive mercuric chloride and 1 part of alcohol, from twenty to sixty minutes.

Put specimen on cover glasses, not slides. Smear needle. Float on surface of petri dish containing fixative, face downward, then turn them around with forceps, face upward. They sink.

2. Pour off mercuric chloride-alcohol; put back into bottle. Pour on iodo-alcohol: alcohol 70 per cent and tincture of iodine enough to give a light port wine color.

3. Let stand from twenty to thirty minutes.

4. Pour off. Seventy per cent alcohol one hour or longer (from twenty-four to forty-eight hours).

5. Pour off. Iron alum, 4 per cent, one hour.

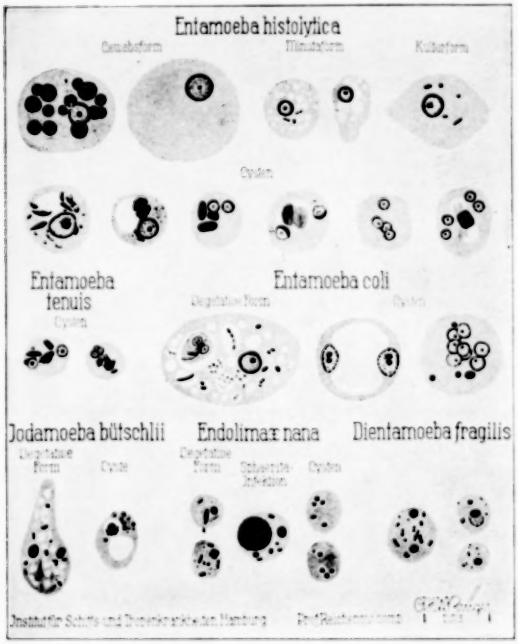
6. Pour off. Stain one hour in Heidenhain hematoxylin, 1 per cent. Should be ripened four weeks. Wash in water. (Heidenhain hematoxylin is made by dissolving 1 Gm. of hematoxylin in 10 cc. of 95 per cent alcohol and diluting to 100 cc. with distilled water. It should not be used for at least four weeks.)

7. Differentiate with 2 per cent iron alum in dish with cross marked on bottom to designate one, two, three and four minutes' immersion. Take out the thinnest for one minute; thicker, more time.

8. Place in water one, two, three and four minutes.
9. Wash in running water for twenty minutes.
10. Place in small bottles the various ingredients for the final staining:

Sixty per cent alcohol.
Eighty per cent alcohol.
Eighty per cent alcohol.
Ninety-six per cent alcohol.
Absolute alcohol.
Xylene.
Xylene.
Mount in balsam.

For the examination of fresh material, in searching for the vegetative form, it is necessary only to use a small amount of the fresh stool between the slide and cover glass. Examine with the low power and then with oil immersion.



Characteristics of various amebas.

In the stained smear the cysts are often mistaken for air bubbles by beginners. They are also to be differentiated from Blastocystis. The addition to the mixture of iodine 1 part, potassium iodide 2 parts, and water 100, or 2 per cent eosin solution, helps this examination. Eosin stains the background but does not stain the amebas and flagellates. The iodine stains nuclei brown. It is therefore very important in examination for cysts. The Dutch investigators Bayor and Kuenen use a concentration method to demonstrate cysts. Another method by Riparte and Petit in order to make the cell structure more visible is as follows: copper chloride 1 Gm., copper acetate 1 Gm., solution of formaldehyde 50 cc., camphorated water (1 part camphor, 2 parts alcohol, 200 water, filtered) 250 cc., distilled water 700, acetic acid 6.5 cc. A hazelnut size piece of stool is rubbed with from 2 to 5 cc. of water; then add 50 cc. of the foregoing solution and shake. Then filter through a gauze filter. Then it is put into a separatory funnel. Add 15 cc. of ether, shake, removing the stopper two or three times, and then let stand. In a few seconds the ether-impregnated detritus goes into the upper layer. In the lower layer are found the cysts and eggs of worms, which one can concentrate by centrifugation for a few minutes. The sediment can be examined fresh or stained.

In addition to Endamoeba histolytica and Endamoeba coli, the staining method for cysts will show the characteristic Entamoeba tenuis, Iodamoeba bütschlii, Endolimax nana and Dientamoeba fragilis, any one or several of which may be present in any one specimen.

The accompanying chart of the characteristics of these various forms is the composition of Professor Reichenow of the Institut für Schiffs- und Tropenkrankheiten of Hamburg, Germany.

R. B. H. GRADWOHL, M.D., St. Louis.

THE HAZARDS OF DRY CLEANING

To the Editor:—I read your comprehensive and timely editorial "The Hazards of Dry Cleaning" (THE JOURNAL, Dec. 16, 1933, p. 1970) with a great deal of interest and benefit, and may I say that I second all of the suggestions contained in it.

One phase of the subject, however, I believe, needs further emphasis. This has to deal with commercial dry cleaning.

Since the introduction of carbon tetrachloride and trichlorethylene as a general solvent in the dry cleaning establishments, I have noted cases of dermatitis of varying severity which followed the wearing by women of clothing recently cleaned in these establishments. In all the instances observed, there occurred an annoying, somewhat scaly, reddened and well defined involvement within forty-eight hours. The localization depended on whether the dress was short or long sleeved. In the former, the areas of the axillary folds, the sternum and the neckline of the dress showed involvement; in the latter, in addition to the foregoing areas, the antecubital fossae were also affected. The degree of dermatitis was dependent on the length of time which the dress was worn. When the causative factor was not soon discovered (as in two instances), the inflammatory reaction became much more severe, the skin becoming edematous; later a papulopustular eruption became superimposed. This secondary pyodermia involved the extremities and the trunk.

The treatment of this contact dermatitis is exceedingly difficult; the mere removal of the offending clothing is not enough as is the case in so many other forms of this group of dermatitis. The skin has to be kept well lubricated with such a preparation as coconut oil. I usually ask these patients to remain at home for several days, put on loose muslin garments and keep themselves literally soaked in oil.

Usually as a result of this chemical irritation there remains the earmarks of the epidermal insult for a considerable period in the form of hyperirritability of the affected skin, which will appear as a dermatitis on the slightest provocation.

LESTER HOLLANDER, M.D., Pittsburgh.

Queries and Minor Notes

ANONYMOUS COMMUNICATIONS and queries on postal cards will not be noticed. Every letter must contain the writer's name and address, but these will be omitted, on request.

INADEQUATE TREATMENT OF SYPHILIS

To the Editor:—A man, aged 29, had a chancre about two years ago, and about eighteen weeks after infection consulted a physician, who gave him eight intravenous injections of neoarsphenamine together with inunctions of mercury. Six months later he had what the physician told him was a second chancre, and at this time he received six more intravenous injections followed by twelve intramuscular injections, presumably neoarsphenamine and bismuth, respectively. During the course of these injections he had a rash, which he was told was a secondary eruption and which finally disappeared again in the course of treatment. Following this he discontinued further treatment of his own accord and six months ago came to me for treatment with his trunk and extremities covered with a papular eruption. In the genital region where the folds of skin rub together were open sores, apparently condylomas. He felt very much "run down" but did not complain of pain of any kind. I took this to be a recurrent secondary reaction, for the pupils reacted sluggishly both to light and in accommodation; but the neurologic examination was otherwise negative. A blood test at this time was Kolmer 4 plus, Kline 2 plus. I started him in on injections of 4.5 Gm. of neoarsphenamine at five day intervals until six treatments had been given. A blood examination at this time revealed the Kolmer reaction to be 4 plus and the Kline reaction 4 plus. I then gave him twelve biweekly 1 cc. injections of bismuth salicylate in oil containing 0.13 Gm. of the drug per cubic centimeter. Blood examination again gave a Kolmer reaction of 4 plus, Kline 3 plus. After two injections of the neoarsphenamine the eruption disappeared and the patient gained weight and felt better in spite of the turn of the blood picture toward the positive side. I then gave him a rest of three weeks and began a repetition of the previous treatment, except that I increased the neoarsphenamine to 6 Gm. because the patient weighed 190 pounds (86 Kg.). During the course of this treatment he developed typical arsenical syphilids on the lower limbs, and dry fissured lesions about the fingers, the palms of the hands, and some on the forearms. He states that he does not feel as well as he did during the first course. I continued with the bismuth injections up to eight and then the blood became Kolmer negative, Kline 4 plus. Should I continue treatment in the same manner, and if not, what should be done? Please omit name and address.

M.D., Minnesota.

ANSWER.—The treatment of this patient, accepting the history as it is given, but correcting the misplaced decimal points in the dosage of neoarsphenamine, has been inadequate throughout. The data are insufficient to determine whether the recurrent penile lesion was a bona fide reinfection or a monorecidive. The first papular eruption with erosive lesions in the groins may well have been either delayed secondaries or secondaries associated with a reinfection. It seems more probable, however, that the whole picture is to be interpreted as serial relapse assuming increasingly the characteristics of a precocious tertiarism. There seems little doubt from the description of the treatment, including the introduction of rest intervals and the inadequate dosage of neoarsphenamine and heavy metal, that the patient is on the verge of the most serious complications as a result of induced allergic response to his infection following inadequate treatment. The most intensive and vigorous treatment is therefore indicated, including a shift from neoarsphenamine to arsphenamine and the administration of bismuth salicylate in doses of 0.2 Gm. every four to six days for several injections, followed by the institution of a five to seven day interval. Close attention must be paid to the mouth during this time. It is now a recognized fundamental principle that treatment in early syphilis should be continuous and not intermittent, and no attention should be paid to the outcome of serologic tests so far as the direction of treatment is concerned during the eighteen months, or even for two years. An effort should be made to approximate at least forty injections of arsphenamine, and from a year to eighteen months with heavy metal.

EFFECTS OF EPHEDRINE IN NOSE

To the Editor:—Will the frequent use of nose drops containing 1 per cent of ephedrine have any harmful effect when given to children? What harmful effects might ensue, if any, and what is the maximum dosage that can be used in this fashion? Please omit name. M.D., Kansas.

ANSWER.—The frequent use of nose drops containing 1 per cent of ephedrine would in most instances, even over a long period, not produce any condition that could not be relieved by ceasing to use the drops. From time to time patients develop a tolerance for the ephedrine so that it does not work well in the nose, and a few may develop hay fever-like symptoms in addition to their original complaints. One must guard against the use of too much ephedrine at a time with a resultant swallowing of the drug, with its constitutional reactions. In very young children, nose drops of oily character have been known to enter the lung, producing undesirable reactions. Ephedrine may be used in oily solutions in strengths of 1 per cent and in aqueous solutions in strengths of from 1 to 3 per cent.

ALCOHOLIC LIQUORS AT SPAS

To the Editor:—I have often heard it stated that alcoholic liquors are dangerous if taken at a time during which a person is undergoing spa therapy; i. e., drinking a natural mineral water and taking hydrotherapy. Is there any physiologic reason for this statement? Please omit name.

M.D., Indiana.

ANSWER.—There is a psychologic rather than a physiologic basis for this prohibition. "Spa therapy" aims at alterative effects, i. e., a change in a person's constitution as a result of change in habits; and the elimination of the use of alcoholic liquor may be of greater importance in the "cure" than the drinking of the natural mineral water. It is just as bad for a person to drink liquor at home as at a "spa."

NERVES AFFECTED IN "JAKE" PARALYSIS

To the Editor:—I have a patient with paralysis of the hands and lower extremities (Jake paralysis). Please advise me just what nerves are affected to cause this condition. D. E. LITTLE, M.D., Eufaula, Okla.

ANSWER.—The same nerves are not affected in all cases of so-called Jake paralysis. Hence the way to find out just what nerves are affected in this particular patient is to go over his motor and sensory condition carefully. The various movements should be tested and a list made of the muscles showing distinct weakness. Next the patient's sensation for touch, pain, heat and cold should be determined and the areas affected should be mapped out. By consulting books on anatomy or neurology it is easy to learn what nerves correspond to the muscles and skin areas involved.

USE OF OXYGEN TENT IN PATIENT WITH HEART DISEASE AND GLYCOSURIA

To the Editor:—Please send me some information of what method and how soon to remove a patient from an oxygen tent, in coronary thrombosis and hypostatic congestion of the lungs. Also if the patient had a blood sugar 333-5, urea N 28. Would you use insulin in such cases. The patient, who took sick suddenly, was never complaining before this illness. LEOPOLD HARRIS, M.D., New York City.

ANSWER.—There is no uniform method of removing a patient from the oxygen tent. The general practice is to keep the patient in the tent as long as there is cyanosis or distressed breathing. If one is satisfied that convalescence is established, it is wise to reduce the oxygen pressure gradually to see how the patient breaths in a reduced atmosphere.

Regarding the blood sugar, insulin would seem to be contraindicated unless there is a real diabetes present. Was there glycosuria? Had the patient a diabetic history? Was the hyperglycemia a constant finding or just a single incident? Since it is known that both insulin and hypoglycemia may be harmful to the damaged heart (Strouse, Solomon; Soskin, Samuel; Katz, L. N., and Rubinfeld, S. H.: Treatment of Older Diabetic Patients with Cardiovascular Disease, THE JOURNAL, May 14, 1932, p. 1703), it should not be used without a real indication. If a patient has true diabetes and does not react to moderate restrictions of diet, small doses of insulin might be advisable, but the patient should be watched very carefully, and the occurrence of any cardiac symptoms or signs would be a definite indication for stopping insulin therapy.

CHANGES IN KAHN TEST

To the Editor:—Dec. 28, 1931, a white woman, aged 40, consulted me. As she came into the office I noticed a definite ataxia to the right. Her chief complaints were extreme nervousness, a tendency to stagger to the right side, fainting spells in which she always fell to the right side, and terrific right temporal headaches. Examination revealed hyperactive reflexes on the right side of the body. The pupils reacted evenly to light and in accommodation. There was a questionable positive Romberg sign. A tentative diagnosis of brain tumor was made and she was sent to an ophthalmologist for examination. The report came back that there were no choked disks and that there were no changes in the eyegrounds to account for the symptoms. A Kahn test was done, which came back 4+. There was no history of any syphilitic infection. The woman was married ten years previously and there is no history of infection in the husband. His Kahn test was negative on two different tests. From Jan. 16 to Feb. 27, 1932, she was given sixteen doses of 1.5 cc. each of

bismuth arsphenamine sulphonate intramuscularly and seven doses of metaphen consisting of 10 cc. each intravenously. A specimen of blood then showed a Kahn reaction of 2+. From March 12 to June 7, 1932, she received seventeen similar doses of bismuth arsphenamine sulphonate and four similar doses of metaphen. She was then changed to sodium bismuth thioglycollate and from June 11 to Oct. 8, 1932, she received twenty-four doses of 3 grains (0.2 Gm.) each. Her blood at this time still showed a 2+ Kahn reaction. She was then changed to a solution of sodium bismuth iodide in ethylene glycol, and from Nov. 5, 1932, to Jan. 21, 1933, she received twenty doses consisting of 2 cc. each. At this time her blood showed a 4+ Kahn reaction. She was then changed to arsphenamine. From Jan. 21, 1933, to the present date she has received two courses of six injections each. Each injection is spaced two weeks from the previous one. Throughout the whole time of treatment she has taken 25 grains (1.6 Gm.) of potassium iodide daily. Why did this patient get a return to a 4+ Kahn reaction a year after treatment was started, in view of the fact that her Kahn reaction dropped to 2+ after only two months of treatment? Is this patient getting sufficient treatment, and if so, is it directed correctly? Is there any further treatment that you would suggest? Clinically the patient is much improved. She has no ataxia or fainting spells and no more headaches. Kindly omit name.

M.D., Missouri.

ANSWER.—The question as to why a ++ Kahn reaction is changed to ++++ following antisyphilitic therapy cannot be answered with certainty, since the true basis of a positive serology is not as yet definitely known. It is to be remembered that there is not always a direct relation between serologic potency and clinical symptoms. A patient showing a very strong reaction might be free from clinical symptoms, while a patient showing a weak reaction might be very ill. Serologic potency, it is believed, depends on the extent of active syphilitic lesions present in the body, while clinical symptoms depend on the particular organ or organs that are being attacked by the spirochete. It is possible that, following syphilitic therapy, certain lesions might be affected more than others and produce, as a result, improvement in clinical symptoms and yet at the same time an increase in serologic potency. As to the question of therapy, it cannot be adequately answered without knowing the Kahn reaction (and colloidal gold curve) on the spinal fluid, since it is possible that this patient has syphilis of the central nervous system.

TREATMENT OF SYPHILIS IN PREGNANCY

To the Editor:—In a case in which the veins are exceedingly small and inaccessible, would you consider it good therapy to use sulpharsphenamine intramuscularly in a pregnant woman of about four months? Is there any increased danger of exfoliated dermatitis, aplastic anemia with purpura, or anemia haemorrhagica occurring? Would the administration of liver extract offset to any degree the danger of the anemias mentioned? Can a close observation of blood smears and count give an early enough warning of any tendency to these diseases? Or could you suggest anything better to be given intramuscularly? Would a dosage of 0.5 Gm. of sulpharsphenamine be excessive every week or should less be used? Bismuth should also be used every week, should it not? Please omit name.

M.D., Ohio.

ANSWER.—The use of sulpharsphenamine intramuscularly in adults, to say nothing of pregnant women, is not recommended on account of the greatly increased danger of exfoliative dermatitis and aplastic anemia from the use of the drug. This increased risk has been amply demonstrated by the most recent studies of reaction to arsenicals used in the treatment of syphilis. There is no way of escaping this risk by any prophylactic measure, particularly as applied to the onset of agranulocytosis or aplastic anemia.

The treatment of this patient can be conducted, if necessary, exclusively with bismuth compounds or with bismuth arsphenamine sulphonate in the full adult dosage. If bismuth arsphenamine sulphonate is employed, an effort should be made to give it as often as twice a week for a series of forty injections. If a preparation of bismuth alone is used, one of the oil soluble bismuth compounds or bismuth salicylate could be given once a week until two weeks before the date of expected delivery.

HAIRY MOLES OF FACE

To the Editor:—A boy, aged 14 years, is about to begin shaving. His face was always clean until his tenth year, when several pigmented areas, about one-eighth inch in diameter, made their appearance along the sides of both face and chin. The moles show an abundant growth of hair, while there is only a scanty growth of beard and mustache. Would shaving have any injurious effect on the moles? Are there any safe depilatories to be used instead of a razor? Please omit name.

M.D., New York.

ANSWER.—Moles in the bearded region of the face in young persons frequently develop coarse black hairs, which contrast with the downy growth of the rest of the face. Shaving would not have any injurious effect on the moles. Depilatories should not be used instead of a razor. If the moles at any time show signs of irritation, they should be excised or removed with electrodesiccation and the hairs destroyed with the electric needle.

DIAGNOSIS OF ANGINA PECTORIS AND CORONARY DISEASE

To the Editor:—1. Can a man have sclerosis of the coronary arteries with attacks of angina pectoris relieved by glyceryl trinitrate and yet have a normal heart sound, pulse, blood pressure and electrocardiogram? 2. Is there any pathognomonic objective sign that will positively diagnose the condition, should the history of cardiac pain be concealed from the examiner for some reason, as in insurance examinations? 3. How can one differentiate the malingerer from the actual patient complaining of anginal attacks; that is, by objective signs, especially when the cardiogram, blood pressure and sounds are negative (as in the examination of prisoners)? Please omit name.

M.D. New York.

ANSWER.—1. Angina pectoris is characterized by no objective signs. The heart may be normal on physical examination, with normal blood pressure or blood pressure either higher or lower than normal, with no roentgenologic changes, and with normal electrocardiograms, and the patient may still have typical attacks, which are relieved by glyceryl trinitrate. At necropsy, no more coronary sclerosis may be found than is concomitant with the patient's age. All one can say is that for some reason the blood supply to the heart muscle is inadequate for the needs of the muscle at that time. That reason may be coronary sclerosis. There is a great deal of reason for assuming in some cases that there is a temporary vasoconstriction of the coronary arteries, but this is a matter of opinion.

2. There are no objective signs pathognomonic of angina pectoris or of coronary disease. Many cases will show electrocardiographic changes but not all. The diagnosis must be based entirely on the patient's account of the attack.

3. If the patient conceals the history, the examiner has nothing on which to base his opinion. Certain electrocardiographic changes may indicate anatomic changes in the heart, probably due to coronary disease, but they tell nothing of whether the patient has attacks of angina pectoris or not. In cases of doubt, it is better to accept the patient's story. A great many patients with supposed false angina and supposed malingerers have died during a so-called pseudo attack.

ITCHING OF PHARYNX AND TONGUE

To the Editor:—I have recently completed a rather exhaustive allergic study on a patient suffering from allergic bronchitis and bronchial asthma. With the removal from her environment of a number of the offending allergens and a course of pollen desensitization there has been a great improvement in the symptoms. A minor degree of pathologic change in the nose and a fragment of tonsil are present. These are both being treated regularly by a competent rhinologist. The patient is severely distressed by an intractable itching of the posterior pharynx and the base of the tongue. This appears to precipitate coughing spells and is annoying both day and night. I am aware of the fact that this symptom is frequently encountered in allergic states, but in view of the marked general improvement I believe this may be a purely local condition which might be relieved by local measures. Can you suggest some therapeutic measure that would be of value? Kindly omit name.

M.D., New Jersey.

ANSWER.—Small pellets of ice placed on the posterior third of the tongue and allowed to melt there often relieve irritation in this region. Gargling with ice cold water a number of times a day is also sometimes beneficial. When these measures fail, tablets containing a small amount of orthoform or ethyl amidobenzoate may be used every two or three hours, the tablets being allowed to dissolve slowly in saliva after being placed on the tongue. Internally, the use of antipyrine in doses of from 0.13 to 0.26 Gm. three times a day together with tincture of belladonna will often alleviate the irritation.

HYPOPHYSEAL CACHEXIA

To the Editor:—Can you give me some references on hypophyseal cachexia? A woman, aged 24, unmarried, complains of loose teeth, underweight (81 pounds, or 36.7 Kg.), and a weak voice. Her weight has remained the same for the past seven or eight years. She appears much older than the stated age; there is marked loss of nutrition; the voice is weak and high pitched; there has been no loss of body hair, although the eyebrows appear scanty; inspection of the teeth shows no infection of the gums, but a border of marked pallor extends round the gum margin about half an inch wide. Beyond this point the mucous membrane appears normal. The cuspids are merely sitting on the alveolar process; no root infection exists and the remaining teeth are normal, roentgenographically. She has a fairly large goiter of the right lobe with no toxic signs. There is a low to and fro murmur opposite the second costal cartilage on the left. The heart is not enlarged. Fluoroscopic examination suggests a patent ductus arteriosus. The remainder of the physical examination is within normal limits. Routine

blood studies are well within normal. The Kahn reaction is negative. The urine shows no albumin or sugar and the microscopic examination shows nothing abnormal. Neurologic examination with special attention to any hypophyseal disturbance is negative. Studies of the basal metabolism and calcium studies of the blood and urine have not been done. Treatment has consisted of attempts to increase the weight by a high caloric diet. However, though the patient is cooperative, she cannot take even a 2,000 calory diet. A high calcium diet has been attempted in conjunction with the high caloric diet, but unfortunately I cannot overcome the vomiting of milk that promptly follows its ingestion. Might such a syndrome be considered suggestive of the so-called Simmonds' disease? Would you care to comment on the possible diagnosis and therapy, if any? Please omit name.

M.D., Michigan.

ANSWER.—The case seems to require more study before a definite diagnosis can be made. Certainly the basal metabolic rate should be determined and a careful gastro-intestinal study should be made. Also a careful analysis of the nervous and psychologic reactions is indicated to exclude the possibility of anorexia nervosa being the basis of the patient's inability to eat. As described the syndrome does not seem like the cachexia of Simmonds' disease, but it does not seem advisable to advise further therapy until the suggested studies are undertaken.

TYPHOID VACCINE IN ARTHRITIS

To the Editor:—In using typhoid vaccine in chronic infectious arthritis, what dose and interval are now believed to be most satisfactory and how long is this treatment usually continued? Please omit name.

M.D., New Mexico.

ANSWER.—The question is divided into three parts: dosage, interval and duration of treatment.

1. The initial dose of the intravenous injection varies between 10 million and 50 million, depending on the source of vaccine. Many hospitals make up their own, and therefore the potency varies. The dosage may be increased by 25 million at each successive injection, depending on the patient's response or reaction.

2. The interval depends on the reaction. Some authorities give the injection every two days until the patient gets a chill and develops fever. Others use the plan of an interval of from four to seven days.

3. The duration of treatment varies with the individual. Some physicians establish the rule of giving a dose every two days until chill and fever appear and then they stop. Others give the injection every four to seven days until the patient has had six good reactions.

NEUROCIRCULATORY ASTHENIA AND DYSPNEA

To the Editor:—In examining men for entolment into the C C C I have not infrequently come across youths (ages 18-25) who show a marked amount of dyspnea on merely hopping up and down on one foot for a minute or two. Many, and it is in these cases that the question is asked, on auscultation, show no evidence of decompensation (râles in chest) and no murmurs of any type. The blood pressure was normal in the majority. There was no evidence of lung changes and no history suggestive of rheumatic infection. Urinalysis was negative. What suggestions may be offered as to the cause of the dyspnea? I now have several similar cases in my camps. Please omit name.

M.D., California.

ANSWER.—It is possible that in the absence of cardiac or pulmonary disturbances the dyspnea might be produced by anemia. Another possibility is merely poor muscular condition. If these factors are not present, a neurogenic origin must be considered. The chief syndrome to be considered under this heading is neurocirculatory asthenia. Respiratory manifestations may predominate in this condition, with the cardiac and muscular elements in the background. In fact, patients may have constant panting even while at rest quite as they may have constant palpitation or diarrhea. Other symptoms, however, should be brought out during work; namely, early exhaustion, tremor, palpitation, tachycardia and sweating.

SENSITIZATION TO ALCALIGENES ABORTUS

To the Editor:—I have a patient, a veterinarian, who is sensitized to Alcaligenes abortus. If he does not wear rubber gloves when called on to treat a cow infected with that disease, a severe dermatitis of his hands and arms develops. Is there any means or methods of desensitizing for this infection? Kindly omit name.

M.D., Minnesota.

ANSWER.—If it has been demonstrated that the veterinarian is sensitized to Alcaligenes abortus, the simplest preventive measure would be to insist that he wear rubber gloves when he has direct contact with fresh animal tissues. It is assumed that the possibility of contact dermatitis from bovine vaginal secretions has been excluded. If not, this could be done by skin tests with bovine vaginal secretions or bovine serum, or both.

In skin testing for sensitivity to Alcaligenes abortus it is important to carry out the intradermal test with very dilute suspensions of the organism in order to avoid a severe reaction. The patch test, the sediment of killed organisms being used under a piece of adhesive plaster, instead of the usual intradermal test, might be a safer procedure.

If the disturbance is proved to be due to sensitization to Alcaligenes abortus, it would be possible to desensitize the patient by intradermal injections or by subcutaneous injections of an Alcaligenes abortus vaccine. It would be well to use a detoxified suspension of the organisms for the desensitization rather than the heat-killed or formaldehyde treated suspension, as described by Foshay (*J. Infect. Dis.* **51**:286 [Sept.-Oct.] 1932). The injections should be small, beginning with 0.01 cc., and should be continued over a considerable period until skin tolerance to an intradermal injection of heat-killed organisms is achieved.

CINCHOPHEN POISONING

To the Editor:—Please give me what information you can about cinchophen poisoning, the antidote, and its relation to acute yellow atrophy of the liver. How quickly do poisoning symptoms appear? What tests are used to prove the connection of cinchophen action on the liver? How common is acute yellow atrophy of the liver due to cinchophen? Please omit name.

M.D., Massachusetts.

ANSWER.—Worster Drought was the first to describe liver disturbances in patients who had taken cinchophen. The first fatality showing yellow atrophy of the liver was reported by Cabot in 1925. Since that time about forty-nine fatalities and fifty-eight severe poisonings have been reported in the literature. It is important to know that fatal accidents may occur within a short time even with therapeutic doses; as small a dose as 3 Gm. daily for two days may produce severe toxic symptoms; on the other hand, 324 Gm. has been taken in the course of four months before the appearance of toxic symptoms. Either the course of the poisoning is rapid, with the death of the patient, or it takes weeks or even months to recover from the toxic effects. From the reports in the literature it appears that hypersensitivity may play an important part in the production of cinchophen poisoning. In animals, degenerative changes of the liver have been reported only with large doses. Control of the liver function during the administration of cinchophen appears to be advisable. Gastro-intestinal disturbances and the appearance of bile pigments in the urine are the first symptoms of the poisoning. After definite symptoms have set in, the treatment is usually not very effective. There is no specific antidote; occasionally encouraging results have been reported by increasing the glycogen store by a carbohydrate diet, by the injection of dextrose and insulin and by duodenal lavage with magnesium sulphate (Eimer, K.: *Deutsche med. Wchnschr.* **57**:1663 [Sept. 25] 1931. Walker, H. G.: *New England J. Med.* **204**:253 [Feb. 5] 1931. Weis, C. R.: Toxic Cirrhosis of the Liver Due to Cinchophen Compounds, THE JOURNAL, July 2, 1932, p. 21. Grigg, W. K., and Jacobsen, V. C.: *Ann. Int. Med.* **6**:1280 [April] 1933).

USE OF RESORCIN SULPHONATE IN HEMORRHOIDS

To the Editor:—Please give me some information concerning the action of resorcin sulphonate with special reference to its application in rectal inflammations and hemorrhoids. Is it ever used internally, and, if so, for what and why? Please omit name.

M.D., Pennsylvania.

ANSWER.—Sulphonation greatly reduces the specific activity of the phenols, and resorcin sulphonate is probably no exception to this general proposition. If this is true, it is doubtful whether resorcin sulphonate is of any special value either locally or internally.

USE OF HEXYLRESORCINOL

To the Editor:—Regarding your answer to the query in THE JOURNAL, August 19, page 625, Sharp and Dohme inform me that hexylresorcinol is not obtainable in the form you specify for oral administration. The strongest product is the Caprokol capsule 0.15 Gm. This would require more than six capsules for a 10 year old child. The solution for use as an enema could be obtained only by buying hexylresorcinol solution S. T. 37 in small bottles, 12 ounces, I believe, being the largest. I am very anxious to try this method in a resistant case of oxyuris infection. Any suggestions would be welcome. Please omit name.

M.D., New York.

ANSWER.—The presence of a solvent, such as oil or glycerin, greatly reduces the activity of hexylresorcinol. On this account it is doubtful whether the use of Caprokol or hexylresorcinol solution S. T. 37 in enemas would be as successful as using crystalline hexylresorcinol.

As stated in previous publications, hexylresorcinol is controlled by Sharp and Dohme, who have temporarily withdrawn

the crystalline form from the market on account of cases of local irritation from improper administration when children have chewed up hexylresorcinol pills and obtained temporary irritation of the mouth. In the meantime, investigators are trying to find some acceptable means of administration.

RELATIONSHIP OF MUSCLE CRAMP TO DROWNING

To the Editor:—When one is reported to have been drowned as a result of cramps, what is thought to be the condition causing a good swimmer to drown? Please omit name.

M.D., Pennsylvania.

ANSWER.—Cramps are involuntary sustained contractions of skeletal or visceral muscle, of a tonic or tetanic character. It is well known that cramps or spasms of skeletal muscle may be induced by prolonged and intense stimulation of the cold nerve endings of the skin. Such muscular spasms may also be induced by severe physical exertion in people not in good physical training. A man may therefore be a good swimmer but not in good physical training or practice for swimming or other severe physical exertion. Such muscle cramps or spasms may involve any muscle or group of muscles in the body but usually not all of them simultaneously. This is true not only of the visceral but also of the skeletal muscles. It may involve the diaphragm and the other muscles of respiration. The cramp or muscle spasm is usually associated with local pain, which tends to inhibit use of other muscles that involve the spastic members either in motion or in tension.

It is conceivable that the trained swimmer might suffer severe spasms of some part of the gastro-intestinal tract leading to such severe pain that the exertion of swimming becomes more or less intolerable. Spasms or cramps of the skeletal muscles in swimming rarely come in the hands, arms and legs at the same time. Probably the death or drowning on the part of a trained swimmer from cramp is largely the result of panic or confusion from fear. The notion that cramp on the part of a swimmer is so dangerous and fatal is generally believed and hence when he feels such a cramp locally he begins to be confused and executes all kinds of useless and futile movements, which accentuate or extend the spasm. It is well known that good swimmers who have some understanding of the body machine can handle themselves well in water with cramps of the arms or cramps in the legs merely by turning on the back and keeping afloat by a slight movement of the arms and legs not already involved in the cramp. Such resting in the absence of fear usually permits the spasm to subside and the swimmer can go on.

REFLECTION OF LIGHT FROM EYES OF ANIMALS

To the Editor:—Why do the eyes of some animals reflect light in darkness and other animals' eyes do not? Which of the commoner animals in this country belong to each group? Please omit name.

M.D., Pennsylvania.

ANSWER.—The visibility of light reflected from any eye is a factor of the intensity of the source of light, the diameter of the pupil, the angle of the incident and reflected beam, and the color of the reflecting fundus. In addition to these factors, there must come into consideration the relative intensity of the illuminating beam and of the area round about the animal. The two factors that are mainly responsible for the visibility of reflection from the eyes of some animals and not others are the diameter of the pupil of the animal's eye and the color of the animal's fundus. With a contracted pupil, the angle of the incident and the reflected beam is so small that any slight variation from a given position prohibits observation of the reflected beam. In the majority of domestic animals, the fundi range from red to yellow and green. With such fundus colors, brilliant reflections may be expected under proper conditions such as are seen from the eyes of cats and dogs. In certain other animals, as the hedgehog and the squirrel, the fundus presents a light gray appearance and as a result no distinct reflection is to be anticipated.

TREATMENT OF HOOKWORM DISEASE

To the Editor:—In THE JOURNAL, Nov. 25, 1933, page 1746, appears a statement relative to the treatment of hookworm disease. I believe that tetrachlorethylene is in all probability as effective as carbon tetrachloride and theoretically decisively preferable, because it does not cause liver damage or any other intoxication that I could discover. Clinically, it seems to be as effective as carbon tetrachloride. Like any anesthetic when taken by mouth, it may cause temporary giddiness, which should not be considered intoxication. The only contraindication that I know against its use is in cases of mixed infestations in which both Ascaris and hookworm are present, in which condition it may cause migration of Ascaris with complications.

PAUL D. LAMSON, M.D.,
Vanderbilt University, Nashville, Tenn.

Council on Medical Education and Hospitals

COMING EXAMINATIONS

ALABAMA: Montgomery, Jan. 9-13. Sec., Dr. J. N. Baker, 519 Dexter Ave., Montgomery.

AMERICAN BOARD OF DERMATOLOGY AND SYPHILOLOGY: Cleveland, June. Sec., Dr. C. Guy Lane, 416 Marlboro St., Boston.

AMERICAN BOARD OF OBSTETRICS AND GYNECOLOGY: *Written (Group B Candidates).* The examinations will be held in various cities of the United States and Canada, April 7. *Oral* (all candidates), Cleveland, June 12. Sec., Dr. Paul Titus, 1015 Highland Bldg., Pittsburgh.

AMERICAN BOARD OF OPHTHALMOLOGY: Cleveland, June 11. Sec., Dr. William H. Wilder, 122 S. Michigan Blvd., Chicago.

AMERICAN BOARD OF OTOLARYNGOLOGY: Cleveland, June 11. Sec., Dr. W. P. Wherry, 1500 Medical Arts Bldg., Omaha.

CONNECTICUT: *Basic Science.* New Haven, Feb. 10. *Prerequisite to license examination.* Address, State Board of Healing Arts, 1893 Yale Station, New Haven.

DISTRICT OF COLUMBIA: Washington, Jan. 8-9. Sec., Dr. W. C. Fowler, 203 District Bldg., Washington.

HAWAII: Honolulu, Jan. 8-11. Sec., Dr. James A. Morgan, 48 Young Bldg., Honolulu.

ILLINOIS: Chicago, Jan. 23-25. Supt. of Regis., Dept. of Regis. and Edu., Mr. Eugene R. Schwartz, Springfield.

MINNESOTA: Minneapolis, Jan. 16-18. Sec., Dr. E. J. Engberg, 350 St. Peter St., St. Paul.

NATIONAL BOARD OF MEDICAL EXAMINERS: The examinations in Parts I and II will be held at centers in the United States where there are five or more candidates, Feb. 14-16, May 7-9, June 25-27, and Sept. 12-14. Ex. Sec., Mr. Everett S. Elwood, 225 S. 15th St., Philadelphia.

NEBRASKA: *Basic Science.* Lincoln, Jan. 9-10. Dir., Bureau of Examining Boards, Mrs. Clark Perkins, State House, Lincoln.

NEW YORK: Albany, Buffalo, New York and Syracuse, Jan. 29-Feb. 1. Chief, Professional Examinations Bureau, Mr. Herbert J. Hamilton, Room 315 Education Bldg., Albany.

SOUTH DAKOTA: Pierre, Jan. 16-17. Dir., Dr. Park B. Jenkins, Pierre.

VERMONT: Burlington, Feb. 7-9. Sec., Dr. W. Scott Nay, Underhill.

WASHINGTON: *Basic Science.* Seattle, Jan. 11-12. *Regular.* Seattle, Jan. 15-16. Dir., Mr. Harry C. Huse, Olympia.

WISCONSIN: Madison, Jan. 9-11. Sec., Dr. Robert E. Flynn, 401 Main St., LaCrosse.

WYOMING: Cheyenne, Feb. 5. Sec., Dr. W. H. Hassed, Capitol Bldg., Cheyenne.

Hawaii October Examination

Dr. James A. Morgan, secretary, Board of Medical Examiners, reports the oral and written examination held in Honolulu, Oct. 9-12, 1933. The examination covered 10 subjects and included 55 questions. An average of 75 per cent was required to pass. Seven candidates were examined, 5 of whom passed and 2 failed. The following schools were represented:

School	PASSED	Year Grad.	Per Cent
Northwestern University Medical School		(1933)	85.4*
Tulane University of Louisiana School of Medicine		(1933)	86.5*
Jefferson Medical College of Philadelphia		(1924)	83.5
Vanderbilt University School of Medicine		(1930)	84
University of Wisconsin Medical School		(1932)	84.7*
School	**FAILED**	**Year Grad.**	**Per Cent**
Chicago Medical School		(1920)	70.7
St. Louis University School of Medicine		(1932)	70.4

Two physicians were licensed by endorsement during September. The following school was represented:

School	LICENSED BY ENDORSEMENT	Year Grad.	Endorsement of
College of Medical Evangelists		(1931), (1933)	N. B. M. Ex.

*License withheld.

Idaho October Report

Hon. Emmitt Pfost, commissioner of law enforcement, reports the oral and written examination held by the Idaho Medical Examining Board in Boise, Oct. 3-4, 1933. The examination covered 13 subjects and included 130 questions. An average of 75 per cent was required to pass. Five candidates were examined, all of whom passed. Six physicians were licensed by endorsement. The following schools were represented:

School	PASSED	Year Grad.	Per Cent
Northwestern University Medical School		(1931)	87, 87
Rush Medical College		(1933)	82
State University of Iowa College of Medicine		(1932)	83
University of Oregon Medical School		(1931)	89
School	**LICENSED BY ENDORSEMENT**	**Year Grad.**	**Endorsement of**
College of Medical Evangelists		(1931)	N. B. M. Ex.
Stanford University School of Medicine		(1928)	California
George Washington University School of Medicine		(1928)	N. B. M. Ex.
University of Louisville School of Medicine		(1929)	Kentucky
Washington University School of Medicine		(1931)	Missouri
University of Nebraska College of Medicine		(1925)	Nebraska

Tennessee September Examination

Dr. H. W. Qualls, secretary, Tennessee State Board of Medical Examiners, reports the written examination held in Memphis, Sept. 29-30, 1933. Twenty-three candidates were examined, all of whom passed. The following schools were represented:

School	PASSED	Year Grad.	Number Passed
Kansas City University of Physicians and Surgeons, Missouri		(1933)	1
Columbia University College of Physicians and Surgeons		(1932)	1
University of Tennessee College of Medicine		(1933,20)	20
Albert-Ludwigs-Universität Medizinische Fakultät, Freiburg, Germany		(1926)	1

Eleven physicians were licensed by endorsement from September 8 to November 6. The following schools were represented:

School	LICENSED BY ENDORSEMENT	Year Grad.	Endorsement of
University of Georgia Medical Department		(1929)	Georgia
State University of Iowa College of Medicine		(1929)	Iowa
University of Louisville School of Medicine		(1933)	Kentucky
Tulane University of Louisiana School of Medicine (1930) Louisiana		(1918)	Mississippi,
Creighton University School of Medicine		(1910)	Nebraska
Long Island College of Medicine		(1930)	New York
University of Pennsylvania School of Medicine (1929) Minnesota		(1917)	Ohio,
Memphis Hospital Medical College		(1895)	Missouri
University of Texas School of Medicine		(1927)	Texas

Book Notices

The Law Against Abortion: Its Perniciousness Demonstrated and Its Repeal Demanded. By William J. Robinson, M.D., Consultant to the Bronx Hospital. Cloth. Price, $2. Pp. 123. New York: Eugenics Publishing Company, Inc., 1933.

Abortion: Legal or Illegal? By A. J. Rongy, M.D., F.A.C.S. Cloth. Price, $2. Pp. 212. New York: Vanguard Press, 1933.

These books are omens of an expansion in the United States of the demand for sex freedom. "So far has the religious taboo against abortion sunk into the consciousness of Western man," says Rongy, "that today even the liberal advocate of birth control does not carry his reasoning to its logical conclusion in the support of abortion." And, says Robinson, "now that the prevenception battle has been won, . . . we are permitted to go a step further and devote some of our energy to the subject of necessary abortion." Both books must be recognized as propaganda in support of a movement to bring about the relaxation or even the repeal of present laws relating to the inducing of abortion. Neither author attempts to show the good that has been and is being accomplished by the laws now in force or the evils that may follow in the wake of their repeal or relaxation. The attitude of both is well shown by Robinson's statement:

> The law against abortion should be repealed, first because it is a vicious, injurious law; and, second, because it is a futile, unworkable law. . . . And, *en passant*, if the law were one hundred per cent workable and efficient, if it made the performance of abortions really impossible, it would be the most pernicious law in our penal code; because it would lead to an enormous number of suicides, to an incalculable amount of anguish, shame, disgrace and ostracism.

The format of Robinson's book and the general tone of its contents leave one in doubt whether it is intended for the medical or the lay reader. Of 100 pages of text, forty are devoted to heart-throb stories of women who suffered, and some of whom died, as the result of criminal abortions or because of inability to have abortions induced. Eighteen pages are devoted to a discussion of methods for inducing abortion, a discussion too elementary for the medical profession and yet of sinister possibilities so far as the public is concerned. The medical profession hardly needs instruction concerning the differences between emmenagogues, abortifacients and ecbolics. To tell the lay reader that in a pregnancy of but a few days' duration emmenagogues "may also help" and then to devote five pages to a discussion of "The Best Emmenagogue Combinations," giving two prescriptions for such combinations, certainly suggests and makes convenient the lay prescribing and use of such drugs. Robinson lays down a brave thesis, which he himself seems afraid to follow to a logical conclusion:

> For the one thousandth and first time we shall repeat, and we shall repeat it again and again, that we want life, but only such life as is desirable to its possessor and to those around. Such life is desirable and sacred. But life that is a curse to its possessor and which he goes on living merely out of cowardice, a life of pain, a life of disease, a life of shame, a life of endless poverty, struggle and drudgery, a life of misery to its possessor and to those around him and to the race in general, is not desirable and is not sacred. And to prevent such life is the highest service that a man can render to the individual family, to the community and to the human race as a whole!

Here we have Robinson the realist. His thesis clearly justifies the killing not only of the embryo and fetus but also of all human beings who come within the category the author defines. It justifies infanticide. It justifies suicide. It justifies euthanasia, either with or without the consent of the person whose life is to be destroyed. But Robinson the idealist will have none of this. He writes:

> I do not see eye to eye with some of our ultra-radicals who consider abortion a matter of no importance (I mean ethically, not hygienically), and who would permit the artificial emptying of the uterus at any time—even as late as the seventh or eighth month; some go further and would not recoil even from an early infanticide. I do not wish to be considered an apostle or adherent of that sort of ultra-radicalism.

Robinson demands, however, neither more nor less than the complete and total abrogation of any law against abortion, and only if complete abrogation is impossible is he willing to accept even a very radical modification of the law. He sums up his demand as follows:

> And so because the law against abortion accomplishes no good but causes an incalculable amount of harm, it should be repealed.
>
> If desired, a clause could be inserted permitting abortion only until the end of the third month, and only a certain number of times in the case of any given woman, as is the case now in soviet Russia.

But if the induction of abortion is to be tolerated "in order to do away with infanticide, in order to save thousands of women from the hands of incompetent and ignorant bunglers, in order to save thousands and thousands of women from shame, disgrace, ostracism, blood poisoning, invalidism, death and suicide," why tolerate it only during the first three months of pregnancy? And if this limitation is proposed because of the increased danger to the mother after the three-month deadline, that very danger, it is obvious, is a reason for enabling women who desire abortions after the third month to obtain the services of the most skilled physicians, not a reason for driving them to the underworld and to incompetent and ignorant bunglers. The suggested limitation of the number of induced abortions any given woman may have is obviously impracticable, for physicians whose services might be sought for such operations would have no means other than the word of interested applicants for treatment to inform them whether those applicants had or had not been subjected to their respective allotted number of operations.

Rongy's book contains about 200 pages of text. For a book of its size and pretensions an index seems necessary, but none is provided. Rongy writes more directly to the medical profession than does Robinson, but even so it is somewhat difficult to determine whether his book was written for the profession or for the public. About one third of it is devoted to a discussion of the historical background of abortion and of the religious attitude toward it. Here and elsewhere in the book the intelligent reader will feel keenly the lack of documentation. It may be true, for instance, as the author states, that in the Oath of Hippocrates the pledge concerning the induction of abortions is not based on ethical, religious or professional grounds but originated somewhat in the nature of a guild or trade union rule, to prevent physicians from encroaching on a field already occupied by "the female doctors of Greece, who were experts in abortion," but the serious reader would like to know the authority for this hypothesis. Likewise, when the reader is told that the national total of abortions has been estimated "to top 2,000,000 per year," and that "it is the opinion of competent medical observers during the last thirty years that there are more criminal abortions performed in this country than in any other country in the world," he would like to be given some basis on which to determine how seriously to regard those statements.

Notwithstanding Rongy's advocacy of the utmost freedom with respect to the inducing of abortion, he calls attention to the fact that abortion threatened the stability of the Roman Empire so gravely that the poets, historians and philosophers of that day sought means for stopping it and persuaded the legislators to enact restrictive legislation. With what safeguards, then, does he propose to surround the induction of

abortion under his suggested scheme, in order that our own national stability may not be jeopardized? What he proposes is apparently the unrestricted induction of abortion, when desired by a pregnant woman, in any case of illegitimate pregnancy, and in the case of any woman who is mentally defective, whether married or single, or who has been deserted by her husband, or left a widow while pregnant, or who has had several children and who wants to halt further child-bearing in order to preserve her health, or whose husband is already providing for several children but is unable "to provide economically" for another child. Whether Rongy proposes the establishment of official machinery for determining before an abortion is induced whether the applicant is or is not entitled to the operation, he does not say.

Rongy is particularly bitter toward the church because of its condemnation of abortion. He apparently overlooks the fact that human life is a continuous process, from the moment of conception to the last heart beat—gamete, embryo, fetus, infant, child, youth and man. The church condemns the killing of the human being at any time. Rongy, however, would have the government approve the killing of the gamete, the embryo and the fetus. Why he would tolerate feticide and forbid infanticide and other forms of homicide is not apparent; the new-born infant may be as much of an embarrassment to its mother as is the unborn babe; the incurable invalid and the insane may be a burden, socially and financially, as insupportable as is an illegitimate or an unwanted infant; and in many cases the bearer of the burden of a disgraced or invalid life may himself vastly prefer that it be terminated. How is the legalization of feticide to be justified while homicide and suicide under analogous conditions are still forbidden?

Neither Robinson's book nor Rongy's would in itself justify a review of the length here devoted to it. The subject matter of these volumes, however, abortion, fully justifies it. The intimate relation that the medical profession has to the matter and the agitation that is going on for a repeal or relaxation of the law relating to the inducing of abortion require the constant, earnest, thoughtful consideration of the matter by every physician. It is not for the medical profession to propose legislation in this field. Laws forbidding the inducing of abortion have not interfered, so far as is known, with the inducing of a therapeutic abortion to save the life of any woman whose life has been endangered by pregnancy, nor are they likely to do so. This is true even though some such laws contain no specific provision authorizing therapeutic abortions. But the profession must watch such legislation as is proposed and endeavor to have such laws as may be enacted limited to such logical bounds as the circumstances may indicate.

Die Haut- und Geschlechtskrankheiten: Eine zusammenfassende Darstellung für die Praxis. Herausgegeben von Prof. Dr. Leopold Arzt und Prof. Dr. Karl Zieler. Lieferung 1, Band III. Durch Pilze bedingte Hautkrankheiten pflanzlicher Ätiologie. Von Priv.-Doz. Dr. Herbert Fuhs. Paper. Price, 10.40 marks. Pp. 172, with 154 illustrations. Lieferung 2, Band IV. Allgemeine Syphilis. Von Prof. Dr. Alfred Stühmer. Allgemeine Erkennung der Syphilis. Von Prof. Dr. Walther Schönfeld. Histologie der Syphilis. Von Prof. Dr. Walther Frieboes. Paper. Price, 9.60 marks. Pp. 161, with 72 illustrations. Lieferung 3, Band V: Morphologie und Biologie des Gonokokkus. Von Dr. Conrad Siebert. Tripper des Mannes. Von Prof. Dr. Richard Frühwald. Harnröhrenverengerung. Von Dr. Alois Glingar. Erkennung und Untersuchung des Trippers beim Manne, spezifische Diagnose. Von Prof. Dr. Walther Schönfeld. Endoskopie der männlichen Harnröhre. Von Dr. Alois Glingar. Paper. Price, 8.20 marks. Pp. 176, with 61 illustrations. Lieferung 4, Band III: Durch Bakterien bedingte Hautkrankheiten I. Prodermien. Von Prof. Dr. Victor Mucha. Durch Bakterien bedingte Hautkrankheiten II. Phlegmone, Erysipel, Erysipeloid, Diphtherie und Pustula maligna. Von Priv.-Doz. Dr. August Matras. Paper. Price, 5.30 marks. Pp. 173-288, with 31 illustrations. Lieferung 5, Band III. Durch Spirochäten und Protozoen bedingte Hautkrankheiten. Von Prof. Dr. Leo Kumer. Durch unbekannte Erreger bedingte Hautkrankheiten. Von Prof. Dr. Leo Kumer. Paper. Price, 8 marks. Pp. 289-448, with 68 illustrations. Lieferung 6, Band IV. Wesen und Verlauf der Frühsyphilis im Einzelnen. Von Prof. Dr. Heinrich Löhe. Maligne Syphilis. Von Prof. Dr. Franz G. M. Wirz. Haut und Schleimhäute bei Spätsyphilis (einschliesslich Mund- und Rachenhöhle). Lymphgefässe und Lymphknoten. Von Prof. Dr. Walther Schönfeld. Paper. Price, 10 marks. Pp. 165-348, with 137 illustrations. Lieferung 7, Band I. Anatomie und Histologie der Haut. Von Prof. Dr. Eduard Pernkopf und Prof. Dr. Viktor Patzelt. Paper. Price, 9 marks. Pp. 140, with 57 illustrations. Berlin & Vienna: Urban & Schwarzenberg, 1933.

The purpose of this publication is to give the practitioner and specialist a more compact, less detailed and more economical work of reference than was provided by the monumental Handbuch der Haut- und Geschlechtskrankheiten which appeared several years ago. The entire work is to be delivered in twenty-five instalments, which are not to be sold separately and eventually will comprise five volumes. A perusal of the first seven instalments indicates that each one is more or less monographic in character and deals with separate phases of the subject. Section 1, by Fuhs of Vienna, is a particularly valuable presentation of the parasitic skin diseases and emphasizes the recent immunologic and clinical advances made in the mycoses. The inclusion of pityriasis rosea in this volume would lead one to infer that the author feels that this eventually will be found to be mycotic in origin. The second instalment includes authoritative articles by Stühmer on general syphilis, diagnostic methods by Schönfeld, and the histology of syphilis by Frieboes. The third section is devoted to gonorrhea in its various manifestations and is along traditional lines. Section 4, by Mucha and Matras, deals with the pyodermias. In the fifth instalment Kumer has some interesting chapters on skin diseases produced by spirochetes and protozoa and those of unknown etiology, among which are herpes zoster, vaccinia, erythema multiforme and pemphigus. It is instructive to note the large number of new remedies that have been tried out in various German clinics in the treatment of pemphigus. In the sixth instalment the contribution by Löhe on early syphilis is noteworthy for the large number of excellent illustrations. The short chapter on malignant syphilis by Wirz seems unnecessary in the light of modern chemotherapeutic success in the treatment of this disease. Schönfeld has contributed a good account of late syphilis of the skin and mucous membranes. The seventh section, by two less well known writers, Pernkopf and Patzelt, on the anatomy and histology of the skin, has some interesting schematic charts and photomicrographs. If future instalments come up to the high standard of the present series there is no doubt that this work will prove a valuable and authoritative contribution, at least as compared with the average textbook. The format is excellent and the numerous illustrations, some of them in colors, drawn from some of the largest dermatologic clinics in the world, will be of great value to the student.

The Dog's Medical Dictionary: An Encyclopaedia of the Diseases, Their Diagnosis and Treatment, Poisons and Their Antidotes, and the Physical Development of the Dog. By Alfred J. Sewell, M.R.C.V.S. New edition revised by Frederick W. Cousens, M.R.C.V.S., Canine Surgeon by Appointment to H. M. King George V, and H. R. H. the Prince of Wales. Cloth. Price, $2.75. Pp. 324, with illustrations. New York: Charles Scribner's Sons, 1933.

As the title implies, the various items concerning practical dog anatomy, disease and treatment appear in alphabetical order. Interspersed throughout the book are a great number of pictures of various pedigreed types of dogs, such as Afghan hound, wire haired Dachshund, and Keeshond. Because of the former inclusion, the book will be welcomed by every experimental laboratory. Of particular value are the descriptions with illustrations of the various types of bandages best fitted for different parts of the dog's frame. From the American point of view it is hard to understand why ether instead of chloroform is only casually mentioned as an anesthetic agent and that the Laidlaw-Dunkin method of the control of distemper is not mentioned at all.

Obstetrical Nursing: A Text-Book on the Nursing Care of the Expectant Mother, the Woman in Labor, the Young Mother and Her Baby. By Carolyn Conant van Blarcom, R.N. Third edition, revised with the assistance of Calvina Macdonald, R.N., and others. Cloth. Price, $3. Pp. 651, with 263 illustrations. New York: The Macmillan Company, 1933.

This edition was prepared with the object of revision in two definite trends: the first, for simplification of care, especially of maternity service in the home; the second, in the field of social service with especial attention to the benefits of mental hygiene in the nursing care of maternity patients. Both the text and the illustrations have been augmented with profit. The book contains all that an obstetric nurse needs to know in the care of her patients and is an excellent reference work for the student and the graduate nurse. The teaching is sound and the text clear and direct. The book is well put up and is printed on high grade paper and in large type. The glossary will be found indeed useful.

Medicolegal

Right of Court to Order Operation Performed on Infant.—Helen Vasko, 2 years old, had a glioma of the retina of her left eye. Medical authorities of the Grasslands Hospital of the Department of Hospitals recommended that the eye be removed. Her parents refused to permit the operation and the Westchester County Society for the Prevention of Cruelty to Children instituted a proceeding in the children's court, Westchester County, New York, to have her declared a neglected child under the provisions of the New York Children's Court Act (Laws 1930, chapter 393). That act defines a "neglected child" as including one whose parent, guardian, or custodian neglects, or refuses, when able to do so, to provide necessary medical, surgical, institutional or hospital care for the child. It authorizes the children's court to provide the necessary medical or surgical care for such a child. In this case, a physician appointed by the children's court to examine the child reported that the eye was permanently blind and that the growth was probably of a malignant nature, would increase in size until it filled the eyeball, and would then burst through and protrude between the lids and that in all probability, if left to nature, it would follow the optic nerve into the brain and that the child would die. In the opinion of this physician, the child had an excellent chance of living if operated on. The court then ordered the operation to be performed and the parents appealed to the supreme court, appellate division, second department, New York.

The law, said the supreme court, is not only zealous in the protection of the civil rights of infants but has a special regard for their moral care, training and guidance. Its beneficence extends also to the conservation of their health and their physical well being, as well as the preservation of their lives. If parents or guardians neglect their duty in respect to any one of these obligations, the state may intervene. Children come into the world helpless, subject to all the ills to which flesh is heir. They are entitled to the benefit of all laws enacted for their protection—whether affecting their property, their personal rights or their persons. The Children's Court Act is constitutional, and the children's court acted in this case not only in strict compliance with the act, but with scrupulous care and moderation and on ample and competent evidence. The order of the children's court was therefore affirmed.—*In re Vasko (N. Y.), 263 N. Y. S. 552.*

Agreement in Restraint of Professional Practice Valid if Reasonable.—The plaintiff and the defendant, two physicians, entered into a partnership agreement for the practice of medicine and surgery in Chicago. Under the contract, the plaintiff obligated himself not to engage in the practice of medicine, in Chicago, independently of the defendant. In a suit to enforce the payment of certain sums provided for in the contract, allegedly due from the defendant to the plaintiff, the defendant contended that the contract was against public policy because it restrained the plaintiff from practicing his profession. This restriction on the plaintiff was unreasonable, it was contended, for two reasons: first, because it was unlimited in time; and, second, because it was not sufficiently limited as to space or territory. With these contentions, the Supreme Court of Illinois could not agree. In *Linn* v. *Sigsbee*, 67 Ill. 75, a practicing physician sold his medical practice and obligated himself "not to establish nor to attempt to establish a medical practice within the aforesaid township of Chili, nor within six miles of his present residence." In that case the Supreme Court of Illinois held that an agreement to practice medicine, if reasonably limited and supported by consideration, is not invalid and that the question of the reasonableness of the contract is to be determined by the court. The restraint imposed by the contract then under consideration was held to be reasonable and the contract to be valid. In *Ryan* v. *Hamilton*, 205 Ill. 191, 68 N. E. 781, the Supreme Court reached a similar conclusion when it held valid an agreement made by a physician never again to practice medicine in or within 8 miles of a designated city without the consent of the second party to the contract, another physician. The decision in *Linn* v. *Sigsbee*, supra, is authority, said the Supreme Court in the present case, for the proposition that the limitation is not unreasonable because it may extend throughout the lifetime of the plaintiff. Counsel for the defendant cited no case where a restriction on the right of a person to engage in his profession, trade or business, limited to a city, town, or territory less than the whole state, has been held unreasonable on such ground. Under the contract the plaintiff was not restrained from practicing his profession at any place in the state outside Chicago and, with respect to practice in the city, the restraint was not total but only that the plaintiff would not practice his profession independently of the defendant. The contract, concluded the court, was supported by a valuable consideration, the restraint imposed was limited or partial and was not greater than was reasonably necessary to protect the contract rights of the defendant. It was not against public policy. The validity of the contract was therefore upheld.—*Storer v. Brock (Ill.), 184 N. E. 868.*

Malpractice: Injuries Attributed to Plaster-of-Paris Impression of Auricle and Auditory Canal.—Dr. Padden attempted to make a wax impression of the auricle and auditory canal of the plaintiff's ears so that phonettes could be made for his use while operating an airplane. According to Dr. Padden, he cleansed and lubricated the plaintiff's right ear, packed it with cotton from the eardrum outwardly about a quarter of an inch, and poured in a plaster-of-paris preparation of the consistency of whipping cream, permitting the preparation to harden for eight minutes, to the consistency of hard butter. When he attempted to remove the hardened preparation a portion of it broke off and remained tightly wedged in the auditory canal. A surgical operation, performed by Dr. Belknap, was necessary to remove it. Subsequently, the plaintiff lost his hearing in his right ear, the sight of his right eye, and his sense of balance, and suffered a partial permanent paralysis of the right side of his face. He brought suit against Dr. Padden and Dr. Belknap. Judgment was entered against Dr. Padden only, who appealed to the Supreme Court of Oregon.

The real question in this case, said the Supreme Court of Oregon, is whether or not the plaster-of-paris mixture was poured down past the false isthmus into the osseous part of the plaintiff's auditory canal. If it was, Dr. Padden was negligent. All expert witnesses testifying at the trial agreed that it would be proper practice to make an impression of the auditory canal with the material and by the method used by Dr. Padden, if the canal was plugged up with cotton as far as the false isthmus, and if the plaster-of-paris mixture was not permitted to go deeper into the canal than the false isthmus. This, continued the court, is not a case in which a physician performs an operation to cure or remove a cause of disease. In such a case the physician is not held to guarantee results. If he possesses and uses the ordinary measure of skill possessed and used by physicians in the community and locality in which he practices, he is not liable for any damage arising from an error in judgment. In such a case, a physician can make only a limited examination of the part to be operated on. Here, there was no reason why Dr. Padden should not have discovered all about the mechanical structure of the plaintiff's ear before he attempted to take an impression. All the experts agreed that no two ears are exact duplicates. The length of the canal varies. The outer or cartilaginous portion may be long and the osseous part short, or vice versa. The angle formed at the point where the outer part joins the inner part varies in different ears. It does not require an expert to know that, if a substance like plaster of paris is poured into a tubular canal that is not straight, somewhat constricted midway, and the walls of which are immovable beyond the constriction, and permitted to set until it reaches the consistency of hard butter, it cannot be extracted without breaking.

The defendant contended that there was no medical testimony from which the jury was justified in finding that he was guilty of negligence. But, said the court, the evidence showed, in conformity with standard authorities, that the auditory canal in the average person is about one inch in length and that the false isthmus is about two-thirds inch from the eardrum. The

evidence showed that the auditory canal in the plaintiff's ear is about average. Dr. Padden testified that he packed the plaintiff's ear with cotton about one-fourth inch outwardly from the eardrum and that he poured the plaster of paris to within that distance of the eardrum, and that it was necessary to pour it down into the osseous canal and to let it stand or harden before attempting to remove it. Thus from a purely mathematical calculation it will be observed that the material would be poured past the false isthmus. The operation was really more of a mechanical than a surgical one. In such instances, it is not always necessary to establish the allegation of negligence by medical testimony. It was a question, said the Supreme Court, for the jury to determine from the facts and circumstances whether the plaster-of-paris mixture was poured past the false isthmus. If it was, there was medical testimony to support the allegations of negligence. The judgment in favor of the plaintiff against Dr. Padden was accordingly affirmed.—*Keadle v. Padden (Ore.), 20 P. (2d) 403.*

Malpractice: Limitation of Actions; Medical Books Used to Cross-Examine Witness.—The plaintiff, Nov. 30, 1926, broke both bones of his left leg about 8 inches above the ankle. He was treated for a period of ten weeks by a physician and then employed the defendant physician, Feb. 3, 1927. A roentgen examination at that time disclosed that the bones were not in apposition. The defendant operated, alined the bones, sutured them and encased the leg in a plaster cast. At the time of the trial, the plaintiff's leg was bowed backward. Alleging a faulty union of the large bone to the defendant's negligent treatment, the plaintiff sued, Nov. 15, 1929. The trial court gave judgment for the plaintiff, and the defendant appealed to the Supreme Court of Michigan, contending, among other things, that the statute of limitations had run against the suit, in that it had not been instituted within two years from the time the cause of action accrued.

The statute of limitations had not run, said the Supreme Court of Michigan. While more than two years had elapsed from the date the defendant assumed charge of the case, there was evidence that as late as February, 1929, the defendant had bandaged the leg. Until treatment of the fracture ceased, said the court, the relation of physician and patient continued, and the statute of limitations had not run. Error was alleged in a ruling of the trial court that when a physician-witness states that a certain book is a standard medical work, the physician may then be asked whether or not that standard work does not contain a certain statement. This is not the rule, said the Supreme Court of Michigan. If a medical witness refers to a textbook as his authority, then the book referred to may be used to contradict him. The trial court erred, too, continued the Supreme Court, in permitting a medical witness, in answer to a hypothetical question, to state what in his opinion was the proximate cause of the bow in the plaintiff's leg. This invaded the province of the jury. As far as the witness could go was to state that the alleged malpractice of the defendant *might* cause the bow in the leg. The trial court refused to instruct the jury that an expert witness, in answering a hypothetical question, assumes as true every fact asserted in the question and that if the jury finds the asserted facts untrue, then it must disregard the answer of the expert to the question. This offered instruction correctly states the law, said the court, and should have been given. For these errors committed by the trial court, the judgment for the plaintiff was reversed and a new trial ordered. *De Haan v. Winter (Mich.), 241 N. W. 923.* The case was tried a second time. Again the trial court gave judgment for the plaintiff, and the defendant appealed to the Supreme Court of Michigan. The trial court permitted counsel for the plaintiff, in cross-examining one of defendant's expert medical witnesses, to bring out the fact that the witness and the defendant belonged to the state medical society, and that a part of the annual dues of the witness was set aside as a defense fund, for the defense of malpractice suits instituted against members. Permitting the cross-examination was not error, said the Supreme Court. For the purpose of affecting the credibility of a witness, he may be cross-examined as to his interest in the suit, including contribution to the expense of it. Counsel for the plaintiff sought repeatedly to have an expert witness for the defendant name some book, publication or medical journal as entering into or forming the basis of his opinion, but the witness refused to do so. Thus baffled, counsel for the plaintiff by a series of questions sought to create the impression that the opinion of the witness was not in accord with eminent medical authority. While the trial court sustained objections to these questions, said the Supreme Court, the jury must have been influenced by this method of cross-examination and the defendant's case was prejudiced thereby. It constituted reversible error and the decision of the trial court was reversed and a new trial granted. —*De Haan v. Winter (Mich.), 247 N. W. 151.*

Malpractice: When Married Woman May Not Sue on Implied Contract.—Generally a patient injured by the failure of a physician to use reasonable skill and care may sue in tort for the injury or in contract for a breach of the terms of employment. *Stokes* v. *Wright*, 20 Ga. App. 325, 93 S. E. 27. The plaintiff in this case, however, was a married woman, living with her husband. She broke her leg. Attributing the necessity for its amputation to a default on the part of the defendant-physicians, she entered suit against them. Apparently because an action in tort was already barred by the statute of limitations, she charged them with a breach of an implied contract to set and treat the leg with reasonable care and skill. The trial court dismissed the case, and the patient appealed to the court of appeals of Georgia, Division No. 2. There was no express contract by the wife to pay the physicians for their services, said the court of appeals, and an implied obligation arose that her husband would pay them. Even though the patient earned her own living and her husband had consented that she should have her earnings, he still had the duty of furnishing his wife with medical attention. In the absence of an express contract on the part of the wife to pay for such attention and in the absence also of facts showing clearly an assumption of individual liability by her, exclusive of the liability of her husband, the husband remained primarily liable. The implied contract in this case was between the physicians and the patient's husband. A suit for a breach of such a contract cannot be maintained by the wife. The trial court properly dismissed the case brought by the wife.—*Scott v. Simpson (Ga.), 167 S. E. 920.*

Privileged Communications: Examining Physician Not Within Rule.—An Iowa statute provides that no practicing physician shall be permitted, in giving testimony, to disclose any confidential communications properly entrusted to him in his professional capacity, and necessary and proper to enable him to discharge the functions of his duty toward his patient. Under this statute, said the Supreme Court of Iowa, the question of whether or not a physician may testify depends on whether or not the relation of physician and patient exists. If the relationship does exist, the physician may not testify. If the relationship does not exist, then the testimony of the physician is admissible. In the present case, the witness was a physician appointed by the United States government for examining veterans seeking pensions. He was directed by the government to examine an applicant for the purpose of ascertaining whether the applicant was entitled to a pension. There was no examination made for the purpose of treatment. Since, said the court, the relationship of physician and patient did not exist at the time the examination was made, the testimony of the physician was admissible.—*City of Cherokee v. Aetna Life Ins. Co. of Hartford, Conn. (Iowa), 247 N. W. 495.*

Society Proceedings

COMING MEETINGS

American Academy of Orthopedic Surgeons, Chicago, Jan. 8-10. Dr. Philip Lewin, 104 South Michigan Blvd., Chicago, Secretary.

Annual Congress on Medical Education and Licensure, Chicago, February 12-13. Dr. W. D. Cutter, 535 North Dearborn Street, Chicago, Secretary.

Tri-States Medical Association of the Carolinas and Virginia, Charlottesville, Va., Feb. 12-14. Dr. James M. Northington, 804 Professional Building, Charlotte, N. C., Secretary.

Current Medical Literature

AMERICAN

The Association library lends periodicals to Fellows of the Association and to individual subscribers to THE JOURNAL in continental United States and Canada for a period of three days. Periodicals are available from 1925 to date. Requests for issues of earlier date cannot be filled. Requests should be accompanied by stamps to cover postage (6 cents if one and 12 cents if two periodicals are requested). Periodicals published by the American Medical Association are not available for lending but may be supplied on purchase order. Reprints as a rule are the property of authors and can be obtained for permanent possession only from them.

Titles marked with an asterisk (*) are abstracted below.

American Journal of Ophthalmology, St. Louis

16: 759-856 (Sept.) 1933

Angioid Streaks of Fundus Oculi. T. Wassenaar, Pretoria, South Africa.—p. 759.

History of Cataract Operations. E. Jackson, Denver.—p. 767.

Experimental Tuberculosis of the Eye. W. A. Ohmart, Denver.—p. 773.

Complete Discission of the Crystalline Lens: I. Preliminary Report of Clinical and Experimental Studies. C. Berens and Olga Sitchevska, New York.—p. 779.

New Stitch in Cataract Operation. G. McD. Van Poole, Honolulu, Hawaii.—p. 788.

Cyst of Uveal Layer of the Iris. A. E. Town, New York.—p. 790.

Growth of Corneal Epithelium into Anterior Chamber. J. Levine, New York.—p. 796.

Cerebral Pseudotumors or Chronic Arachnoiditis: Report of Three Cases. G. G. Marshall, Rutland, Vt.—p. 799.

Possible Explanation of One Type of Color Blindness. R. D. Williams, Columbus, Ohio.—p. 803.

American Journal of Pathology, Boston

9: 539-658 (Sept.) 1933

Posterior Pituitary Activity from an Anatomic Standpoint. H. Cushing, Boston.—p. 539.

Malformation Assumed to be True Hermaphroditism: Case. J. McFarland, Philadelphia.—p. 549.

Phosphorus and Alcoholic Cirrhosis. F. B. Mallory, Boston.—p. 557.

Permeability of the Kidney to Bacteria. M. H. Book, Toronto.—p. 569.

Micro-Incineration of Herpetic Intranuclear Inclusions. L. E. Rector and Eleanor J. Rector, St. Louis.—p. 587.

*Rare Form of Saccular Cardiac Aneurysm with Spontaneous Rupture. W. C. Hunter and R. L. Benson, Portland, Ore.—p. 593.

*Actinobacillosis of Man: Report of Fatal Case. D. C. Beaver and L. Thompson, Rochester, Minn.—p. 603.

Erythroleukoblastosis in the New-Born. Ruth C. Wanstrom, Ann Arbor, Mich.—p. 623.

Congenital Heart Disease with Pulmonary Arteritis: Interventricular Septal Defect, Dextroposition of the Aorta and Dilatation of the Pulmonary Artery. H. L. Stewart and B. L. Crawford, Philadelphia.—p. 637.

Reducing Substance Found in Chromophilic Adenomas and in Normal Anterior Pituitary. T. J. Putnam and H. B. Wilcox, Boston.—p. 649.

Effect of Testicular Extract on Experimental Tuberculosis in Rabbits: I. Skin Lesions. T. T. Walker and D. C. Hoffman, Boston.—p. 651.

Saccular Cardiac Aneurysm with Spontaneous Rupture.—Hunter and Benson describe an almost unparalleled type of cardiac aneurysm situated over the external aspect of the left ventricle. Death was the result of spontaneous rupture of the thin fibrous wall of the aneurysm and the pericardial adhesions about it. The mechanism by which the aneurysm was produced is not easily explained. The clinical data suggest that, three months prior to death when the patient was seen by a physician, he was suffering from cardiac symptoms referable to the heart and compatible with coronary thrombosis. The other significant observation at this time was the systolic blood pressure of 160 recorded during the seizure. Cardiac hypertrophy (640 Gm.) was observed at necropsy without demonstrable cause other than possibly pericardial adhesions and the characteristic renal arteriolar lesions of essential hypertension. The authors believe that slow and progressive ischemia of a small area of myocardium brought about by high grade atherosclerosis of the vessel supplying the myocardial scar may have led to disappearance of patches of heart muscle and finally to replacement fibrosis. Less probably the scar may represent the end-result of focal rheumatic or syphilitic myocarditis. Proof of these diseases is lacking, but certain features about the perivascular aortic and coronary arterial lesions are suggestive of rheumatic myocarditis. The aneurysm may have had its inception three months prior to death either during or shortly after an attack of severe thoracic pain and cardiac embarrassment.

Actinobacillosis in Man.—Beaver and Thompson present a case of actinobacillosis in man in which pathologic studies were made of the lesions. The lesions are essentially similar to those that have been described in cattle, except that in man the lesions are much more widespread and sulphur granules, such as occur in bovine lesions, apparently do not occur. The authors describe the lesions in their case as granulomatous abscesses severely affecting the lungs, liver and spleen. Lesions similar to those observed in man and cattle were produced in experimental animals. The organism isolated revealed a close cultural and antigenic relation to Actinobacillus lignieresi and a more distant relation to Pfeifferella mallei and Bacillus whitmori. Thompson has previously shown that Actinobacillus lignieresi of bovine and human origin, Pfeifferella mallei and Bacillus whitmori are antigenically interrelated, and has proposed that they be included in a common genus. This relationship, as far as the organism in the authors' case is concerned, is also confirmed from the pathologic point of view, for the lesions in man and in experimental animals were similar to glanders, as well as exhibiting similarities to bovine actinobacillosis. Although the organism under consideration showed minor cultural differences and somewhat different antigenic phenomena from a typical strain of Actinobacillus lignieresi of bovine origin, nevertheless, it seems justifiable to regard the organism in this case as a variant of the usual bovine strain of Actinobacillus lignieresi.

American Journal of Public Health, New York

23: 895-1016 (Sept.) 1933

Sanitary Control Over the Production and Handling of Shellfish on the Pacific Coast. C. E. Green, Portland, Ore.—p. 895.

Resident Mortality from Tuberculosis in Urban and Rural New York According to Age, Sex, Color and General Nativity. Elizabeth Parkhurst, Albany, N. Y.—p. 901.

Treatment of Water by Certain Forms of Silver. J. Gibbard, Ottawa, Ont., Canada.—p. 910.

*Study of the Opsonocytophagic Power of Blood and Allergic Skin Reaction in Brucella Infection and Immunity in Man. I. F. Huddleson, H. W. Johnson and K. E. Hamann, East Lansing, Mich.—p. 917.

Toxicity of Organic Fluorides. W. P. Yant, Pittsburgh.—p. 930.

Incidence of Xerophthalmia and Night Blindness in the United States: Gage of Vitamin A Deficiency. A. F. Hess and D. B. Kirby, New York.—p. 935.

Modified Quevenne Lactometer for the Public Health Laboratory Control of Market Milk. R. V. Stone, Los Angeles.—p. 939.

Laboratory Aids in Diagnosis and Serum Therapy of Pneumococcus Pneumonia. A. B. Sabin, New York.—p. 978.

Brucella Infection and Immunity in Man.—The method of Huddleson and his associates for determining the opsonocytophagic power of blood for Alcaligenes is a modification of the Leishman and Veitch technic. The authors' studies show that the in vitro activity of the polymorphonuclear cells in whole citrate blood for Alcaligenes is an expression of immunity to Alcaligenes and an indication of the progress toward recovery in active infection. The absence of or a low phagocytic activity obtained in conjunction with a negative allergic skin test is evidence of susceptibility to Alcaligenes infection. Infection in an individual is indicated by a positive allergic skin test obtained with Alcaligenes nucleoprotein in conjunction with a negative or a low opsonocytophagic activity of the whole citrated blood for Alcaligenes.

American Journal of Tropical Medicine, Baltimore

13: 447-546 (Sept.) 1933

Further Studies on Etiology of Granuloma Inguinale. W. A. DeMonbreun and E. W. Goodpasture, Nashville, Tenn.—p. 447.

Natural Infection of Trypanosoma Cruzi Chagas Found in Rhodnius Pallescens Barber in Panama. L. H. Dunn, Panama, R. of P.—p. 471.

Observations on Host Selection of Ornithodorus Talaje Guern. in Panama. L. H. Dunn, Panama, R. of P.—p. 475.

*"Brucellin," a Possible Specific for Undulant Fever in Man: Preliminary Report. I. F. Huddleson and H. W. Johnson. East Lansing, Mich.—p. 485.

Host Specificity and Specificity of Animal Parasites. E. R. Becker, Ames, Iowa.—p. 505.

Some Observations on Trypano Agglutinins and Lysins and Their Production with Killed Trypanosomes. L. Reiner and S. S. Chao, Tuckahoe, N. Y.—p. 525.

Effects of a High Vegetable Protein Diet on Trichomonad Flagellates of Rats. R. Hegner, Baltimore.—p. 535.

Nomenclature of Plasmodium Ovale Stephens 1922. C. F. Craig, New Orleans.—p. 539.

"Brucellin" in Treatment of Undulant Fever.—Huddleson and Johnson report twelve of their eighty cases of undulant fever and the results obtained from their treatment with

"Brucellin." They prepare this agent by growing each of the three species of Alcaligenes in separate flasks of beef liver infusion broth, adjusted to a p_H of 6.6, for sixty days at 37 C. The inoculated flasks are shaken vigorously at weekly intervals. At the end of the growing period, each flask is examined bacteriologically and, if found contaminated, is discarded. The broth is clarified by centrifugation at a speed of 3,000 revolutions per minute for four hours. The clear liquid is decanted and adjusted to a p_H of 7 with tenth normal hydrochloric acid. The product from each of the three species is pooled and filtered twice through sterile Berkefeld N filters. The filtered liquid is transferred to sterile flasks or tubes and incubated for five days at 37 C. to determine sterility. It is standardized and transferred to sterile 1 cc. vials or stored in larger containers until ready for use. The procedure which the authors recommend for Brucellin in the treatment of undulant fever is as follows: An intradermal injection of about 0.05 to 0.1 cc. of Brucellin is given to determine the sensitiveness of the patient. If no marked systemic reaction is elicited within forty-eight hours, 1 cc. may be given intramuscularly. This dose should be repeated at intervals of three days until four injections have been given. The intramuscular injections usually cause a local reaction and the temperature of the patient rises to 104 or 105 F. About one to three hours after the temperature reaches its highest point, it drops gradually or rapidly to near normal. There is as a rule an increase in the severity of the symptoms, which do not persist for more than twenty-four hours. If the systemic reaction from the intradermal injection is severe, it is advisable to start the intramuscular injections with 0.1 or 0.2 cc. In children the beginning dose should be 0.2 cc. The ambulatory or chronic type of case of long standing does not respond readily to four injections of 1 cc. of Brucellin. It may be necessary to increase the dose gradually to 5 cc. by 1 cc. steps in order to effect recovery in these patients. The authors are convinced that the remarkable results that they obtained in their series cannot be attributed to mere coincidence.

Annals of Internal Medicine, Ann Arbor, Mich.

7: 281-416 (Sept.) 1933

The Internist as His Own Psychiatrist. A. Stengel, Philadelphia.—p. 281.
Cerebral Circulation: XXV. Remarks on Clinical Physiology. S. Cobb, Boston.—p. 292.
Evidence for a Cerebral Vascular Mechanism in Epilepsy. W. Penfield, Montreal.—p. 303.
*Value of Alimentary Galactosuria in Diagnosis of Jaundice. H. J. Tumen and G. M. Piersol, Philadelphia.—p. 311.
Concerning Placental Hormones and Menstrual Disorders. A. D. Campbell, Montreal.—p. 330.
Effect of Vitamins and Inorganic Elements on Growth and Resistance to Disease in Children. A. Brown and F. F. Tisdall, Toronto.—p. 342.
*Further Observations on Treatment of Pernicious Anemia with Parenteral Horse Liver Extract, Including One Case of Pernicious Anemia Following Gastrectomy. O. Richter, A. E. Meyer and A. C. Ivy, Chicago.—p. 353.
Research in Electrocardiography. W. D. Reid, Boston, and S. H. Caldwell, Cambridge, Mass.—p. 369.
*Differential Diagnosis of Diseases of Liver and Spleen with Aid of Roentgenography After Intravenous Injection of Thorium Dioxide Sol (Thorotrast): Experience with Eighty Patients. W. M. Yater and L. S. Otell, Washington, D. C.—p. 381.
Some Aspects of Cell Physiology. W. J. V. Osterhout, New York.—p. 396.

Alimentary Galactosuria in Diagnosis of Jaundice.—Tumen and Piersol used the galactose tolerance test in studying fifty-four cases of jaundice. Eighteen were obstructive jaundice, twenty-three catarrhal jaundice and thirteen toxic hepatitis. Galactosuria of 3 Gm. or more occurred in 54 per cent of the patients having toxic hepatitis, in 78.3 per cent of those having catarrhal jaundice and in 5.5 per cent of those having jaundice due to obstruction. Of the group having obstructive jaundice only one patient showed a definitely positive response to the test. This patient had a stricture of the common bile duct with jaundice of a duration of four weeks. At operation, definite biliary cirrhosis was found. Two other patients with biliary cirrhosis excreted normal amounts of the sugar. Two patients with obstructive jaundice had galactosuria of between 2 and 3 Gm. In both patients the duration of the jaundice was short and nothing was found other than the slight increase in excretion of the sugar to indicate that damage of the cells of the liver existed. In one patient who had a partial obstruction of the common duct for about four months, the galactose tolerance test was normal. Of the twenty-three patients having catarrhal jaundice, only five excreted less than 3 Gm. of galactose and of these one patient passed 2.005 Gm. The other eighteen had galactosuria of more than 3 Gm. Seven of the thirteen patients suffering from toxic hepatitis excreted more than 3 Gm. of the sugar, and three of the remaining six passed between 2 and 3 Gm. of galactose.

Treatment of Pernicious Anemia.—Richter and his associates treated twenty-one patients having pernicious anemia and induced complete blood remissions in three by the intravenous administration of the equine liver extract. From 2 to 4 cc. (1 cc. prepared from 10 Gm. of liver) of the material was injected at intervals of from one to three days. Following the rapid injection of liver extract in one patient having a low blood count with an initial hemoglobin of 24 per cent and a red cell count of 840,000, a mild systemic reaction was occasionally noted. This consisted of an immediate drop in blood pressure, accompanied by a rapid, weak pulse and dyspnea and later followed by a generalized feeling of warmth. This systemic reaction was usually absent when the liver extract was injected slowly; i. e., less than 1 cc. per minute. No serious reactions were observed among sixty intravenous injections. One of the three patients, previously resistant to treatment with large amounts of oral liver extract and whole liver, made a complete hematologic remission in fifty-seven days on intravenous injections of equine liver extract. Equally good responses were obtained from subcutaneous and intravenous injections. Twenty-four patients suffering from relapses were treated with daily injections of subcutaneous horse liver extract. The average dose used was 2.5 cc., containing the active principle of 25 Gm. of horse liver. Patients entering the hospital in a semicomatose or moribund condition received two or three injections (from 50 to 75 Gm.) daily until evidence of a reticulocyte response was obtained, and then once daily until the hemoglobin and red cell counts became normal. The maximal reticulocyte response was obtained between the fifth and seventh days and varied in this series of cases from 16.8 to 47.2 per cent. The average of the entire group was 27.6 per cent, omitting the patients who received previous therapy which had absorbed the maximal reticulocyte peak. The authors' experience indicated that only a temporary remission is obtained from liver therapy and that maintenance treatment is necessary to prevent another relapse. A complete hematologic remission was produced in intervals of from four to eight weeks and the majority of the patients treated showed an average daily gain of 1 per cent hemoglobin and 57,914 red cells from the average daily injection of 2.14 cc. of equine liver extract.

Diagnosis of Diseases of Liver and Spleen.—Yater and Otell describe a new method of visualization of the liver and spleen developed mainly by Radt and Oka. It consists in the intravenous injection of thorium dioxide sol, from which the radiopaque thorium dioxide is engulfed by the reticuloendothelial cells of the body. Since these cells are most numerous in the liver and spleen, these organs are visualized better than other parts of the body. This method is a laboratory procedure and should in no way replace clinical methods of diagnosis. It may not be harmless, but except for the possibility of radioactivity contraindications are negligible. Reactions are few and are not serious. The results of this method alone were diagnostic of the nature of the lesions of the liver in twenty-four patients. Evidence suggestive of the nature of the disease of the liver or spleen was obtained in eleven, the nature of an undiagnosed abdominal mass was determined in seven and confirmation of the enlargement of the liver or spleen or both was obtained in thirteen. The method was valuable in ruling out lesions of the liver or spleen in twelve and supplementary information was obtained from it in eleven, so that a working diagnosis could be made. The position of the diaphragm was established in two and the method was of scientific value in only two. No aid was obtained from it in eight, and in one patient the wrong diagnosis was made on the basis of the method. The authors state that the following points may be determined by means of this method: (1) the presence of enlargement of the liver or spleen, (2) the decision of the question as to whether a mass in the upper part of the abdomen is the liver, the spleen or something

else, (3) the presence of metastases in the liver, (4) the presence of a primary tumor, cyst or abscess in the liver, (5) in many cases the nature and extent of such intrahepatic diseases as cirrhosis and extensive scarring of the liver from syphilis, (6) the progress of such diseases of the liver, (7) the presence of free fluid in the abdomen, (8) the existence of such lesions of the spleen as tumor, infarct, abscess, fibrosis and leukemia, (9) the existence of rupture of the liver or spleen, (10) the position of the diaphragm, (11) the presence of accessory spleens and (12) possibly the presence of obstruction of the common bile duct.

Annals of Otol., Rhinol. and Laryngology, St. Louis

42: 641-960 (Sept.) 1933

The Influence of Sir Felix Semon on the Development of Laryngology. I. Frank, Chicago.—p. 641.
Spread and Phagocytosis of Particulate Matter in Nasal Mucous Membrane of Rabbit. B. J. McMahon, St. Louis.—p. 660.
Tactile Sensation as Related to Hearing Testing and Hearing Impressions Through Nerves Other Than the Eighth. D. MacFarlan, Philadelphia.—p. 680.
Otosclerosis in a Seven Months Fetus. L. K. Guggenheim, St. Louis. —p. 690.
Congenital Atresia of External Auditory Meatus. L. Richards, Boston. —p. 692.
Elimination of Lipiodol from Nasal Sinuses. J. M. LeMée, Paris, France.—p. 712.
Otosclerosis Complicated by Other Lesions: Study of Roentgenograms, Audiograms, Laboratory and Clinical Findings. E. P. Fowler, New York.—p. 714.
*Study of Twenty-Four Cases of Neck Infection. A. L. Beck, New Rochelle, N. Y.—p. 741.
Studies of Nasal Cilia in the Living Mammal. A. W. Proetz, St. Louis. —p. 778.
Fracture of Styloid Process and Its Tonsil Fossa Complications: Report of Case. J. A. Babbitt, Philadelphia.—p. 789.
Accidental Perforation of Esophagus: Gastrostomy, Recovery: Plea for Retrograde Dilatation in Small Size Strictures. C. J. Imperatori, New York.—p. 799.
Empyema of Petrous Apex: Further Observations and Case Reports. S. J. Kopetzky and R. Almour, New York.—p. 802.
Tuberculosis of Esophagus: Report of Case Following Lye Ingestion. M. C. Myerson, New York.—p. 829.
Physiology of Hearing, Aural Acuity, Bone Conduction: Critical Review. M. J. Gottlieb, New York.—p. 835.
Malignancies of Upper Air Passages: Statistical Review. S. Salinger, Chicago.—p. 850.
Some Observations on Temporal Bone Sections and Otitic Meningitis. L. C. Boenet, St. Louis.—p. 866.
*Advantages of One-Stage Laryngectomy Through a Straight Midline Incision in Cases of Intrinsic Cancer. W. R. Brandon, New York. —p. 878.
*Dicthane as Local Anesthetic for Nose and Throat. H. L. Stitt, Cincinnati.—p. 887.
Pantocain as a Substitute for Cocaine: Preliminary Report. A. F. Laszlo, New York.—p. 892.

Infections of the Neck.—Beck discusses infections of the neck, especially deep pus in the neck, and the surgical route in such cases. The source of such infection is in or about the tonsils. In connection with deep pus in the neck there is often an unrecognized thrombosis of the internal jugular vein which gives a fatal septicemia. The author presents an analysis of twenty-four cases of infection of the neck, all except two of which were treated surgically. For infection of the prevertebral fascia or retropharyngeal abscess he employed a direct incision of the pharyngeal wall through the mouth or an incision along the anterior border of the sternomastoid muscle lateral to the larynx, as recommended by Dean; for infection of the pharyngomaxillary, parotid and submaxillary space, an approach through the submaxillary space after elevating the gland, as recommended by Mosher, or a direct approach beneath the angle of the jaw without elevating the gland; for infection of the carotid sheath and visceral fascia, an incision along the anterior border of the sternomastoid muscle as for jugular resection, and for posterior triangle infection, an incision along or behind the posterior border of the sternomastoid muscle.

Laryngectomy and Intrinsic Cancer.—The technic of Brandon differs from that of Mackenty in the manner of the incision and the method of drainage. The larynx is exposed through a straight midline incision beginning just below the hyoid bone and extending to the second ring of the trachea. This straight midline incision gives perfectly adequate exposure for skeletonization of the larynx in all cases of intrinsic cancer. Any slight advantage which the T-shaped incision may have in the way of exposure is more than offset by disadvantages when it comes to postoperative healing and the dangers of infection. Before the midline incision is closed, two small lateral incisions for drainage, about three-fourths inch long, are made parallel to the upper portion of the wound and just anterior to the sternocleidomastoid muscle. Two other lateral incisions large enough to admit a double drain are made opposite the trachea, just anterior to the sternocleidomastoid, for drainage around the lower part of the wound. A small rubber catheter drain tube with three openings in the center, close enough together to drain the center of the wound, is placed through and through the upper incisions from one side to the other of the deep wound. A double Mackenty drain tube wrapped in gauze and open only at its distal and proximal end is placed in each upper lateral incision, just below the through and through tube, and is pushed in near to the center of the wound. In each of the lower drainage incisions a double rubber drain tube wrapped in iodoform gauze, and with an opening about 1 cm. from the distal end, is placed to the bottom of the wound pointing slightly inward and upward. The midline incision is then closed with parallel mattress stitches of heavy silkworm-gut, following the Mackenty technic.

Local Anesthetic for Nose and Throat.—From a study of the use of the hydrochloride of piperidinopropanedial diphenylurethane (dicthane) as a local anesthetic for the nose and throat, Stitt concludes that the drug, if properly used, is a satisfactory local anesthetic to replace cocaine for all routine uses in the nose and throat. It may be used in considerably lower concentrations than cocaine, although the onset of anesthesia is somewhat slower. The resulting anesthesia is more lasting than that produced by cocaine and frequently much more striking. Its action on the ear drum allows an almost painless paracentesis. In a series of several hundred cases in which hydrochloride of piperidinopropanedial diphenylurethane has been used there have been no signs of toxicity and the drug has not produced the undesirable reactions sometimes found with cocaine. It is safe for routine use as a spray to relieve pain after tonsillectomy and is preferred for this purpose to acetylsalicylic acid.

Archives of Pathology, Chicago

16: 315-452 (Sept.) 1933

Anatomic Evidence of Functional Disorders of the Heart. O. Saphir, Chicago.—p. 315.
*Lycopodium Granuloma: Its Clinical and Pathologic Significance, Together with Note on Granuloma Produced by Talc. W. Antopol, New York.—p. 326.
*Leiomyoma of the Prostate: Report of Three Cases. D. L. Dial and B. Halpert, New Haven, Conn.—p. 332.
Hypertension with Retroperitoneal Ganglioneuroma and Softening in Brain and Spinal Cord: Report of Case in Young Man. F. H. Jergesen, Oakland, Calif.—p. 340.
Examination of Pathologic Tissue by Filtered Ultraviolet Radiation. C. J. Sutro and M. S. Burman, New York.—p. 346.
Normal Variability in Weight of Adult Human Liver and Spleen. Edith Boyd, Minneapolis.—p. 350.
Negative Result from Transfer of Material from Human Acute Multiple Sclerosis to Macacus Rhesus Under Optimal Conditions. N. P. Hudson and R. R. Grinker, Chicago.—p. 373.

Lycopodium Granuloma.—Antopol states that Lycopodium, because of its fine spicules, has a tendency to become adherent to any tissue on which it is deposited and that on manipulation it may be forced beneath the surface. It is therefore possible for an operative specimen to become contaminated with spores of Lycopodium during removal. To demonstrate this, the freshly removed specimen from a patient operated on for acute appendicitis was intentionally handled with gloves which had been powdered with these spores. After the specimen had been dehydrated, embedded, sectioned and stained, microscopic examination revealed many of the spores completely embedded within the tissue. It is obvious that this may lead to an error in diagnosis. To avoid such an error it is necessary that the spores be found within giant cells or within a granulomatous lesion. The author reports six illustrative cases. Animal inoculation with the spores of Lycopodium clavatum resulted in the formation of granulation tissue after from two to six weeks, which on microscopic examination was not unlike the reaction in man, including the presence of the spores within the giant cells. Further experimental studies on the various phases of this problem are in progress. It is also possible that the crystals of magnesium silicate (talc) produce such lesions. This idea obtains support in the finding of the crystals within the giant

cells in the fistulous tract. The author presents a case which demonstrates the formation of minute talc granulomas in an otherwise normal appendix.

Leiomyoma of the Prostate.—During the past year, Dial and Halpert observed three cases of solitary myomatous nodules of the prostate. They discuss these and the eight cases reported previously in the literature. Depending on size, location and concomitant changes in the prostate, they produced disturbances either of urination or of defecation. Seven of the patients had urinary symptoms only. The remaining four had primarily rectal manifestations. In most of the patients with urinary symptoms, the presence of the myomatous nodule perhaps only exaggerated the disturbances due to enlargement of the rest of the prostate. In none of these could the urinary difficulties be attributed to the myomatous growth alone, although the growth arising in the prostate proper (mostly in the median portion) contributed to the distortion of the urethra. In the group of patients with rectal disturbances, the tumor obviously produced obstruction. Arising in the posterior portion of the prostate, it grew toward the rectum. The location of these leiomyomas with respect to the prostate and the surrounding organs suggests a genetic difference in the origin of the tumor. The available information is insufficient to ascertain the validity of this suggestion.

Canadian Public Health Journal, Toronto

24: 405-454 (Sept.) 1933

Combined Dark Field Outfit in the Early Diagnosis of Syphilis. A. L. McNabb, Gladys Matthews and A. D. McClure, Toronto.—p. 405.
Rules for Choice of Causes of Death in the Dominion Bureau of Statistics. E. S. Macphail, Ottawa, Ont.—p. 413.
Modern Swimming Pool Construction. E. H. Darling, Hamilton, Ont. —p. 420.
Diagnostic Clinic in Pathology in Control of Cancer. J. E. Bates, Toronto.—p. 429.
Observations on Tuberculosis Statistics in Canada, 1921 and 1931. R. E. Wodehouse, Ottawa, Ont.—p. 433.

Endocrinology, Los Angeles

17: 485-620 (Sept.-Oct.) 1933

Endocrine Associations. A. W. Rowe, Boston.—p. 485.
Effect of Anterior Pituitary-Like Hormone on Ovary of Hypophysectomized Rat. H. Selye, J. B. Collip and D. L. Thomson, Montreal.—p. 494.
*Relation of Adrenal Cortex to Vitamins A, B and C. Julia E. Lockwood and F. A. Hartman, Buffalo.—p. 501.
Relation of Anterior Pituitary to Carbohydrate Metabolism. B. O. Barnes and J. F. Regan, Chicago.—p. 522.
Influence of Adrenal Cortex Extract on Resistance to Certain Infections and Intoxications. W. J. M. Scott and W. L. Bradford, Rochester, N. Y.; F. A. Hartman, Buffalo, and O. R. McCoy, Rochester, N. Y.—p. 529.
Influence of Calcium and Iodine on Growing Rats. Juanita Thompson, Toronto.—p. 537.
Comparative Studies of Gonad-Stimulating Hormones. C. F. Fluhmann, San Francisco.—p. 550.
Chemical Studies on One Hundred and Fifty Normal Human Thyroids from Charleston, S. C. H. Von Kolnitz and R. E. Remington, Charleston, S. C.—p. 563.
*Determination of Specific Dynamic Action of Protein and Its Value in Diagnosis of Pituitary Disease. M. A. Goldzieher and M. B. Gordon, Brooklyn.—p. 569.
Production of Decidiomas in Immature Rats by Pituitary Treatment. M. C. Shelesnyak, New York.—p. 578.
*Hyperinsulinism Treated with Insulin: Case. Preliminary Report. H. J. John, Cleveland.—p. 583.
Osseous Development of Diabetic Children. P. A. Gray and M. J. Geyman, Santa Barbara, Calif.—p. 587.

Relation of Suprarenal Cortex to Vitamins.—Lockwood and Hartman determined the influence of cortical extract on vitamin A, B and C deficiency, respectively. Guinea-pigs were used in the vitamin C and rats in the vitamin B and A experiments. When administered by mouth, the cortical extract afforded no protection against avitaminosis C and B. However, when the extract was injected intraperitoneally, it (1) improved the growth curve and scurvy score in avitaminosis C, (2) improved the growth curve and delayed the onset of symptoms in avitaminosis B and (3) had no influence in ameliorating the symptoms in avitaminosis A. Suprarenal weights showed hypertrophy of the suprarenals in vitamin C and B deficiencies and atrophy in vitamin A deficiency. Hypertrophy was measured over a period of time after single suprarenalectomy in the vitamin C experiments. It was found that after single suprarenalectomy the hypertrophy increased as the interval of time after the removal of the first gland increased, measured over an interval of from four to eight weeks. In the vitamin C series, after single suprarenalectomy the activity of the remaining suprarenal, as measured by its influence on the onset of scurvy, increased to a degree greater than is found with the two normal intact suprarenals. A decrease in this overactivity was noticeable at approximately the end of the third week after the operation. The injection of cortical extract containing cortin delayed the onset of symptoms in avitaminosis C and B but had no influence in avitaminosis A. Either cortin or some unidentified substance must be responsible for this effect. Because the extract is most effective (1) early in the experiment when some vitamin from the preexperimental period is still available in the organism and (2) when a partial protective quantity of the vitamin is fed, the authors believe that cortin or some unidentified substance aids in the utilization of vitamins C and B. Since cortical extract retards the onset of the avitaminosis symptoms of vitamins C and B, they suggest that an ample supply of these vitamins would be advantageous in suprarenal cortical insufficiency.

Specific Dynamic Action of Protein and Its Value in Pituitary Disease.—Goldzieher and Gordon determined the specific dynamic action of protein in 264 patients. Signs and symptoms of pituitary disturbances were present in 196. There were sixty-eight cases used as controls, which included normal subjects as well as some presenting various nonpituitary endocrinopathies, such as hyperthyroidism or hypothyroidism or ovarian deficiency. The basal metabolic rate was established by the usual technic, and determinations were calculated according to the method of Benedict. The following morning a test meal was given consisting of the whites of three hard boiled eggs, a thin slice of toast and a cup of tea without sugar, cream or milk. After a rest of two hours, the metabolic rate was again determined and the difference between the basal rate and the reading after the test meal was compared. Every patient had at least two readings made at each time. Each patient was studied according to a routine procedure and the diagnosis made on the basis of a careful history of development, growth, nutrition and sexual function; on thorough physical examination, including the special fields of gynecology, gastroenterology and ophthalmology; on anthropometric studies, roentgen observations, whenever indicated, especially of the sella turcica and bone development in children, and on chemical studies. The average specific dynamic action in the pituitary cases was 4.47 against 16.3 in the controls, and the incidence of a specific dynamic action below 10 was 86 per cent in the pituitary cases against 21 per cent in the controls. In twelve cases the specific dynamic action increased after prolonged treatment with anterior lobe extracts together with small doses of thyroid. Patients having a pituitary tumor or an ovarian deficiency showed a specific dynamic action well above all others. Determination of the specific dynamic action after the ingestion of a small protein test meal is a valuable aid in the diagnosis of pituitary disease.

Hyperinsulinism Treated with Insulin.—John reports the case of a woman who was subject to repeated attacks diagnosed as hyperinsulinism. She was treated with small doses of insulin (10 units) after meals with a view to forestalling discharge of that hormone by the pancreas. The results were notably favorable. Whether or not 10 units of insulin three times a day is the optimal dosage has not yet been determined. Perhaps a gradual increase to the point of tolerance might prove more effective in some cases. Another point to be determined by further study is whether training the pancreas to put out less insulin will stabilize the function of the pancreas, so that insulin may be discontinued. The author plans to reduce the amount of insulin gradually, until it is eliminated completely.

Iowa State Medical Society Journal, Des Moines

23: 495-538 (Sept.) 1933

Radical Gastric Surgery in Peptic Ulcer. H. M. Richter, Chicago.—p. 495.
Angina Pectoris. F. R. Holbrook, Des Moines.—p. 496.
Electrocardiogram and Its Relation to Diagnosis and Prognosis of Angina Pectoris and Coronary Occlusion. H. A. Collins, Des Moines. —p. 500.
Intra-Ocular Foreign Body: Unusual Case. J. E. Rock, Davenport.—p. 503.
Retinoblastoma. F. L. Secoy, Sioux City.—p. 506.

Journal of Nervous and Mental Disease, New York

78: 221-332 (Sept.) 1933

Acute Ascending Myelitis Following Administration of Typhoid Vaccine: Report of Case with Necropsy Findings. R. F. Gayle, Jr., and R. A. Bowen, Richmond, Va.—p. 221.
Study of Developmental Craniocerebral Topography as Determined by Orthoscopic Method. W. T. Peyton, Minneapolis.—p. 232.
*Conduction of Labyrinthine Impulses to Cortex. L. Aronson, New York.—p. 250.
Intracranial Hemorrhage in Purpura Hemorrhagica. B. J. Alpers and W. Duane, Jr., Philadelphia.—p. 260.

Conduction of Labyrinthine Impulses.—Aronson confirms the observation of Spiegel that, after strychninization of the posterior ectosylvian and suprasylvian convolutions in cats and dogs, stimulation of the labyrinth can produce epileptiform convulsions. Experiments were performed in which one labyrinth was destroyed and the previously mentioned cortical areas were strychninized on the same and then on the opposite side. In these experiments, rotation still produced epileptiform convulsions. These experiments led to the conclusion that each labyrinth is connected with the crossed as well as the homolateral cortex. After total severance of the posterior longitudinal fasciculus, rotation still caused epileptiform convulsions when the suprasylvian and ectosylvian convolutions were strychninized. The author concludes that labyrinthine impulses reach the cortical centers by way of the posterior longitudinal bundle and that there exist also other tracts outside these pathways for this conduction.

Journal of Pharmacology & Exper. Therap., Baltimore

49: 1-132 (Sept.) 1933

Physiologic Action of the Principles Isolated from Secretion of Bufo Arenarum. K. K. Chen, H. Jensen and A. L. Chen, Indianapolis and Baltimore.—p. 1.
Physiologic Action of the Principles Isolated from Secretion of European Green Toad (Bufo Viridis-Viridis). K. K. Chen, H. Jensen and A. L. Chen, Indianapolis and Baltimore.—p. 14.
Physiologic Action of the Principles Isolated from Secretion of Japanese Toad (Bufo Formosus). K. K. Chen, H. Jensen and A. L. Chen, Indianapolis and Baltimore.—p. 26.
Tranquilizing and Respiratory Depressant Effects of Tribrom-Ethanol (Avertin), Amylene Hydrate, Isoamylethylbarbituric Acid (Amytal) and Ethyl (l-Methyl-Butyl) Barbiturate (Pentobarbital) Alone and In Combination with Morphine on the Rat. O. W. Barlow and J. D. Gledhill, Cleveland.—p. 36.
Influence of Morphine on Premedication Value of Tribrom-Ethanol (Avertin) and Tribrom-Ethanol Fluid (Avertin Fluid) in Relation to Nitrous Oxide Anesthesia in the Rat. O. W. Barlow and J. T. Duncan, Cleveland.—p. 50.
Influence of Morphine on Premedication Values of Ethyl (l-Methyl-Butyl) Barbiturate (Pentobarbital) and Isoamylethylbarbituric Acid (Amytal). O. W. Barlow and J. T. Duncan, Cleveland.—p. 60.
Observations on Effect of Calcium on Action of Cocaine. W. Salant and W. M. Parkins, Cold Spring Harbor, Long Island, N. Y.—p. 67.
Pharmacologic Action of Phosphorus Acid Esters of the Phenols. M. I. Smith, R. D. Lillie, E. Elvove and E. F. Stohlman, Washington, D. C.—p. 78.
Acute Degenerative Changes and Changes of Recuperation Occurring in the Liver from Use of Ethyl Alcohol: A Functional and Pathologic Study. W. deB. MacNider, Chapel Hill, N. C.—p. 100.
Action of Sodium Oxalate in Normal and Thyroparathyroidectomized Cats. W. Salant and W. M. Parkins, Cold Spring Harbor, Long Island, N. Y.—p. 117.

Kansas Medical Society Journal, Topeka

34: 333-374 (Sept.) 1933

Acute Head Injuries and Their Management. A. R. Hatcher, Wellington.—p. 333.
*Trichomonas Vaginalis Vaginitis. H. V. Holter, Kansas City.—p. 337.
Intracranial Aneurysm: Case Report. W. C. Menninger, Topeka, and J. L. Dixon, Clay Center.—p. 342.
Hodgkin's Disease of the Jejunum, Mesentery, Liver, Retroperitoneal Glands and Both Ovaries. W. Cox, Wichita.—p. 346.
Perivesicular Fibromyoma: Benign Tumor with Acute Manifestations. E. R. Furgason, Independence.—p. 349.

Trichomonas Vaginalis Vaginitis.—In treating Trichomonas vaginalis vaginitis, Holter thoroughly cleanses the vulva, vaginal wall, cervix and anal region with tincture of green soap and warm water. The vagina is cleansed with warm tap water, wiped as dry as possible and dried by holding a low pressure air current at the mouth of the speculum for a few minutes. The vagina and cervix are then sprayed with a 1:1,000 solution of hexylresorcinol by connecting a spray to the low pressure air current. A tampon soaked in solution of boroglyceride is then inserted high into the vagina. The vulva and thighs are then wiped dry and painted with a 50 per cent solution of glycerin. The tampon is removed the next day and the patient takes a douche with 1 tablespoonful of tincture of green soap in 2 quarts of water. Douches should be taken morning and night on the two days following the treatment. The vulva and thighs are painted with the 50 per cent solution of glycerin after each douche. These treatments should be continued until the trichomonads are absent on at least three successive hanging drop examinations. When the treatments are discontinued, the patient takes lactic acid douches daily. During pregnancy, the local treatments can be continued as outlined, until about six weeks before term. After that time it is advisable to use 4 per cent mercurochrome instillations with a sterile catheter every other day. In resistant cases the vaginal walls and cervix may be painted with tincture of iodine instead of the solution of hexylresorcinol.

New England Journal of Medicine, Boston

209: 519-564 (Sept. 14) 1933

Fat and the Diabetic. E. P. Joslin, Boston.—p. 519.
Carcinoma of Rectum and Sigmoid, with Particular Reference to the Disease as Seen in Youth. W. M. Shedden, Boston.—p. 528.
Acquired Hypersensitivity to the Arsenobenzol Radical of Bismarsen. F. M. Thurmon and M. M. Tolman, Boston.—p. 540.
Endemic Typhus Fever in Boston: Report of Ten Cases. A. C. Ernstene, Cleveland, and J. E. F. Riseman, Boston.—p. 542.
Familial Congenital Dislocation of the Hip. S. S. Hanflig, Boston.—p. 545.
Clinical and Economic Features of Arthritis in Ex-Members of the Military Service. P. B. Matz, Washington, D. C.—p. 547.

New Orleans Medical and Surgical Journal

86: 147-204 (Sept.) 1933

Treatment of Syphilis in Children. J. Signorelli, New Orleans.—p. 147.
Therapy in Primary Syphilis, with Especial Reference to Bismuth Arsphenamine Sulphonate (Bismarsen). H. W. E. Walther, New Orleans.—p. 150.
Treatment of Visceral Syphilis: The Use of Bismuth. O. W. Bethea, New Orleans.—p. 152.
Treatment of Neurosyphilis. F. L. Fenno, New Orleans.—p. 156.
*Bacteriophagy in the Treatment of Infections of Superficial and Deep Tissues: Report of Two Hundred Cases. F. F. Boyce, R. Lampert and Elizabeth M. McFetridge, New Orleans.—p. 159.
Convalescent Serum in Prevention and Attenuation of Measles. H. F. Garrison, Jr., Jackson, Miss.—p. 165.
Midwifery Customs in India Which Favor Tetanus and Pressure Gangrene of Mother and Decomposition of the Unborn: Case Reports. H. W. Knight, New Orleans.—p. 172.
Mandibular Third Molar Infections and Complications. S. L. Tiblier, New Orleans.—p. 178.

Bacteriophagy in Treatment of Infections.—Boyce and his associates observed that they have not found dosage to be of great importance in the bacteriophage treatment of infections of superficial and deep tissues. If the results are not prompt they increase it, hoping that an increased amount of bacteriophage may compensate for a possible lack of potency, but when the results are satisfactory they continue with the original dose. They have given as many as seven successive injections, in doses ranging from 0.5 to 5 cc., and have found, as did d'Herelle, that large doses were without harmful effects. The application of the jelly to open wounds is far more satisfactory than the older method of using moist dressings or of injecting fluid material into open cavities in which it could not be expected to remain, but it is the authors' impression that the lysate is rather more effective. In the single case in which they used the intravenous route they bore in mind d'Herelle's warning that bacteriophage must be used in adequate dilution (from 1 to 2 per cent in quantities of 500 cc. of physiologic solution of sodium chloride) and should be administered slowly, in order to avoid the risk of anaphylactic shock.

Oklahoma State Medical Assn. Journal, Muskogee

26: 315-346 (Sept.) 1933

Some Practical Points in Hand Surgery. C. R. Salsbury, Oklahoma City.—p. 315.
The Crippled Hand. C. von Wedel, Oklahoma City.—p. 320.
Injuries of Nerves and Tendons of Hand. S. L. Koch, Chicago.—p. 323.
Acute Appendicitis: Problem. H. Reed, Oklahoma City.—p. 329.

Public Health Reports, Washington, D. C.

48: 1031-1068 (Aug. 25) 1933

Malarial Fever in Narcotic Addicts: Its Possible Transmission by Hypodermic Syringe. G. H. Faget.—p. 1031.
A Form of Experimental Endocarditis Produced in Rabbits. O. F. Hedley and Edythe J. Rose.—p. 1038.

Surgery, Gynecology and Obstetrics, Chicago

57: 147-290 (Aug.) 1933

Sacro-Iliac Arthritis. T. A. Willis, Cleveland.—p. 147.
Infrapulmonary Empyema. A. S. W. Tourneff, New York.—p. 156.
Study of Vesical End of Ureter in Hydronephrosis: Report of Fifteen Cases. H. L. Kretschmer and W. G. Hibbs, Chicago.—p. 170.
Spinal Anesthesia: Clinical and Experimental Study. M. Grodinsky and C. P. Baker, Omaha.—p. 187.
Factors Which Decrease Risk in Operations on Colon and Rectum. C. F. Dixon and J. T. Priestley, Rochester, Minn.—p. 206.
*Studies on Immobilization of Normal Joints. L. W. Ely and M. C. Mensor, San Francisco.—p. 212.
Effect of Anterior Hypophysis on Conception and Pregnancy in Guinea-Pig. G. L. Kelly, Augusta, Ga.—p. 216.
Heliotherapy and Orthopedics in Surgical Tuberculosis. A. Rollier, Leysin, Switzerland.—p. 220.
*Method of Dealing with Proximal Jejunal Loop in Posterior Pólya Anastomosis. F. H. Lahey, Boston.—p. 227.
Renal Tuberculosis: Diagnosis and Treatment, with Study of Ninety-Seven Cases of Nephrectomy for Tuberculosis. R. B. Henline, New York.—p. 231.
Torsion of the Spermatic Cord. V. J. O'Conor, Chicago.—p. 242.
Bilateral Lobectomy. L. Eloesser, San Francisco.—p. 247.
Removal of Vertebral Bodies in Treatment of Scoliosis. H. L. von Lackum and A. DeF. Smith, New York.—p. 250.
Pernicious Anemia Syndrome in Gastrectomized Patients. S. M. Goldhamer, Ann Arbor, Mich.—p. 257.
*Phenyl Mercury Nitrate: Its Clinical Uses in Gynecology: Preliminary Report. L. H. Biskind, Cleveland.—p. 261.

Immobilization of Normal Joints.—Ely and Mensor review and attempt to determine just what pathologic changes may occur in the experimental animal following immobilization. They observed the following definite microscopic anatomic changes: 1. The cartilage shows a closer approximation of articular surfaces. 2. There is thinning, irregularity, fibrillation and in places vacuolization of the cartilage. 3. Fibrin plaques are evident between the surfaces of the joint apparently related to the synovial membrane. 4. The areolar tissue about the periphery of the joint becomes of a denser consistency and encroaches between the articular surfaces in places, causing a substitution of the cartilage with connective tissue type of cell. 5. No definite fibrous adhesions are demonstrable between the surfaces of the joint. The authors do not entirely agree with Muller, who, while confirming the anatomic observations of earlier investigators, stated that only extreme grades of immobilization give discernible changes. In their series the immobilization was not complete, as if the bone had been in a plaster-of-paris cast with skeletal traction, nor was the immobilization constant during the entire period. In spite of the absence of these factors, however, the fixation was complete enough to give the microscopic picture described.

Proximal Jejunal Loop in Posterior Pólya Anastomosis.—In dealing with the proximal jejunal loop after having satisfactorily completed the posterior Pólya anastomosis, Lahey employs the following method: The ligament of Treitz is cut from its lowest insertion into the jejunum up to its origin in the mesenteric root. This permits of mobilization of the uppermost part of the jejunum, so that the proximal loop of jejunum now anastomosed to the stomach can be passed up through the slit made in the transverse mesocolon, and in this way the entire proximal loop of jejunum is brought above the mesocolon and is excluded from the greater general peritoneal cavity. While the true vascular root of the transverse colon is still above the junction of the jejunum with the duodenum, nevertheless there is less angulation of the proximal jejunum than when the proximal jejunal loop enters the greater peritoneal cavity at the jejunal fossa and is again passed upward out of the greater peritoneal cavity through a slit in the transverse mesocolon. It has the additional advantage that now only a single segment of intestine, the distal jejunal loop, emerges through the transverse mesocolon. Snug suture of the slit in the transverse mesocolon about the single loop of intestine is thus possible and the danger of hernia through this slit is lessened. The plan of placing the entire proximal loop of jejunum above the transverse mesocolon in a posterior Pólya anastomosis has, if anything, not added to but diminished certain of the technical difficulties of this type of anastomosis after partial gastrectomy. In all the cases in which it has been employed, the anastomosis has functioned well, and any question of the need of entero-enterostomy between the proximal and distal loops of jejunum has been eliminated.

Phenylmercuric Nitrate.—Biskind treated seventy consecutive cases of infections of the vagina and the cervix with phenylmercuric nitrate. A smear of the urethral secretion was taken as a routine. The vagina was opened with the usual bivalve speculum and a cervical smear was then made. Subsequently the entire vagina was cleansed and the cervical canal was wiped dry. Phenylmercuric nitrate was then instilled into the cervical canal with a cotton applicator and it was held in place while a cotton ball saturated with the medication was used to swab out the vagina. The applicator was then removed and a tampon, the distal end of which was saturated with phenylmercuric nitrate, was inserted. The patient was instructed to remove the tampon after twenty-four hours and then to begin the daily douche. Dilutions of 1:25,000 and 1:12,500 were used at first, but it was soon evident that lower dilutions could be used with safety. Continued experimentation afforded sufficient evidence that optimal results were obtained by using a 1:1,250 solution, which, according to Weed and Ecker, is the saturation point for phenylmercuric nitrate in water. Favorable response to the use of this antiseptic was invariable in all the conditions encountered, both specific and nonspecific, except when Trichomonas vaginalis was the inciting agent. The character of the infection can be changed and rapid amelioration of the condition may be obtained often with but a single application of this antiseptic. The results of the use of phenylmercuric nitrate in this series ranged from rapid and complete clinical recovery to improvement sufficiently marked so that adjuvant treatment could be successfully applied.

Virginia Medical Monthly, Richmond

60: 331-396 (Sept.) 1933

Pharmacology of Digitalis. H. B. Haag, Richmond.—p. 331.
Observations in the Management of One Hundred Foreign Bodies in Air and Food Passages. E. G. Gill and J. A. Pilcher, Jr., Roanoke.—p. 335.
Renal Function Tests. E. P. Alyea, Durham, N. C.—p. 340.
*Grain Itch: Report of Two Cases Occurring in Small Epidemic. H. E. Kittredge, Washington, D. C.—p. 357.
Prognostic Value of the Electrocardiogram. J. W. Hunter, Jr., Norfolk.—p. 360.
The Survival of the Family Doctor. R. K. Flannagan, Richmond.—p. 364.
Examining Men for Road Relief Work in Virginia. B. F. Randolph, Arrington.—p. 367.
General Paresis Viewed from a Modern Standpoint. B. C. Keister, Washington, D. C.—p. 369.
Breast Cancer: Anatomy of the Breast. H. M. Hayter, Abingdon.—p. 371.
Id.: Cancer of the Breast: General Pathologic Considerations. H. W. Bachman, Bristol.—p. 372.
Id.: Symptoms and Differential Diagnosis. Beverley F. Eckles, Galax.—p. 375.
Id.: Treatment: X-Ray and Radium: End Results. J. T. McKinney, Roanoke.—p. 377.
Id.: Treatment by Other Methods, with Results. H. H. Trout, Roanoke.—p. 381.

Grain Itch.—Kittredge presents two cases of grain itch, occurring in an epidemic of eight cases caused by contact with débris from infected wheat straw. The characteristic lesion of the eruption is an urticarioid wheal surmounted by a tiny central vesicle, which rapidly becomes lactescent or even puriform. The vesicles vary in diameter from 0.5 to 2 mm. When of the larger size, the cutaneous picture may strikingly resemble that of chickenpox. The distribution of the eruption varies, but the neck and the trunk and, to a lesser extent, the arms and the legs are usually involved. The face may show a few lesions, but the hands and the feet are ordinarily exempt. Itching is invariably violent if not intolerable and, as in scabies, is worse at night, making sleep difficult or impossible. Malaise, anorexia, nausea, vomiting, chilliness and a rise of temperature also may be experienced. Schamberg's ointment was applied for the acute stage. One of the patients was entirely well, and in the other the eruption had almost completely involuted, twelve days after treatment had been instituted.

Wisconsin Medical Journal, Madison

32: 565-664 (Sept.) 1933

Physiotherapy an Essential Specialty in Medicine. J. E. Rueth, Milwaukee.—p. 573.
Transurethral Resection in Prostatic Obstruction. J. C. Sargent, Milwaukee.—p. 579.
Finding Tuberculosis in Apparently Healthy Youth. A. A. Pleyte, Milwaukee.—p. 584.
Etiology and Pathology of Renal Infection (So-Called Surgical Kidney). W. J. Carson, Milwaukee.—p. 591.
Extemporaneous Laboratory Aid. V. A. Chapman, Milwaukee.—p. 594.
Chronic Prostatitis. C. G. Richards, Kenosha.—p. 595.

FOREIGN

An asterisk (*) before a title indicates that the article is abstracted below. Single case reports and trials of new drugs are usually omitted.

British Medical Journal, London

2: 365-404 (Aug. 26) 1933

Prevention of Accidents and Complications in the Course of Treatment in Chronic Osteomyelitis. H. W. Orr.—p. 365.
*Significance of Vitamins in Practical Experience. L. J. Harris.—p. 367.
Nervous Control of Abdominal Blood Vessels and Viscera. D. T. Barry. —p. 373.
*Etiology and Prevention of Toxemias of Pregnancy. G. W. Theobald. —p. 376.

Significance of Vitamins.—Harris states that correct nutrition cannot be left to instinct, to the use of natural unspoiled foods, to a varied diet or to a process of free selection. Recent official reports show that no less than from 80 to 90 per cent of the elementary school population in London gave evidence of having had some degree of rickets, notwithstanding the decreasing severity of the disease. Statistical data have been collected to show that, under our climatic conditions, unless special prophylactic measures are taken, some degree of rickets supervenes in a large proportion of instances with an appreciable proportion of severe cases and that no common foodstuff contains sufficiently large amounts of the antirickets vitamin. Cod liver oil has proved a sterling remedy but has the disadvantage that it may be impracticable to give enough to ensure full protection in every case. Experience shows that the most certain remedy is viosterol. From a practical standpoint it is sometimes an advantage to use a food in which the requisite quantity of viosterol has already been incorporated by the manufacturers. Ultraviolet therapy presents difficulties in the administrative direction for "wholesale" prophylaxis. For curative treatment, viosterol is undoubtedly the method of choice; it can easily be given at a sufficiently high and precisely standardized level. When administering viosterol it is essential to adhere strictly to the correct dose, since overdosage gives rise to hypervitaminosis. Contrary to what is often supposed, the toxic overdose for the human being is close to the optimal therapeutic dose. The author recommends a dose of 1,500 international units a day for ordinary prophylactic use, and 3,000 or a maximum of 5,000 units for curative treatment. Experience shows that smaller doses may be only partially protective. The minimal toxic dose for the infant is about 10,000 units. The author discusses the mode of action of vitamin D and condemns parathyroid treatment for infantile tetany and other conditions of calcium or phosphate deficiency arising from inadequate retention of food calcium and phosphate. Vitamin A cannot be regarded as a general anti-infective agent, although it is advisable to ensure that diets are adequately provided with it because the offspring receives but a moderate amount prenatally and in the milk. There is no evidence to support the suggestion that the prevalence of constipation and stasis is due to the lack of vitamin B. It is essential that all infants should be dosed with adequate vitamin C (orange juice), as this vitamin is destroyed to a greater or less extent during the pasteurization of milk.

Prevention of Toxemias of Pregnancy.—Theobald believes it improbable that any one toxin could cause the widely varying symptoms associated with the toxemias of pregnancy, or that a number of separate toxins should originate in the products of conception. The fact that the hepatic lesions peculiar to eclampsia may be caused by dietetic or mechanical factors, or a combination of the two, disposes finally of the strongest argument in favor of a toxin of pregnancy. He suggests that the fetus affects the fixity of the internal environment and that all the toxemic disorders may be regarded as deficiency diseases. It follows that there is no fundamental causal difference between ordinary morning sickness and eclampsia. This hypothesis is not contradicted by any known fact and is supported by the results of calcium therapy. If excessive salivation, vomiting, cramps, dermatitis herpetiformis, edema and other symptoms can be cured by the injection of calcium, it is logical to suppose that they are caused by its deficiency. The number of patients who have been treated is small, but the success that has attended calcium therapy in such a variety of conditions warrants its extended trial. A great disservice has been done to the science of dietetics by those enthusiasts who stress this or that vitamin without considering the diet as a whole or the importance of personal hygiene. The author claims that a complete, well balanced, appetizing and easily digested diet, rich in the vitamins and in calcium, iron and iodine, if given early in pregnancy, will prevent the onset of toxemias (but not always of albuminuria), although it may be necessary to increase the available amount of calcium by the injection of calcium gluconate: indeed, it might be expedient and, in the end, economical to give routine injections of this mineral at the thirty-second and thirty-sixth weeks of pregnancy. He further believes that such a diet would increase the resistance of the woman to puerperal infection. The one advantage of this hypothesis, which is possessed by no other, is that it can be put to the test, and even under "field" conditions.

Indian Medical Gazette, Calcutta

68: 485-544 (Sept.) 1933

Observations on Unusual Case of Acute Hemorrhagic Purpura. E. S. Phipson.—p. 485.
Some Observations on Two Cases of Disorder of the Liver in Infancy and Childhood. S. P. Bhattacharya and K. C. Chaudhuri.—p. 488.
Studies on Action of Atebrin in Plasmodium Infection of Monkeys. R. N. Chopra and B. M. Das Gupta.—p. 493.
Studies on Inguinal Granuloma: II. Bacterial Flora of Granuloma. T. B. Menon and D. R. Annamalai.—p. 499.
Id.: III. Donovan Organism of Granuloma. T. B. Menon and T. Krishnasami.—p. 500.
Bacillemia in Leprosy. J. Lowe.—p. 503.
*Mechanism of Immunity in Malaria: Proof of Phagocytosis of Malarial Parasites by Large Mononuclear Cells in Malaria. H. Stott.—p. 507.
*New Operation for Drainage of the Pleura. F. C. Fraser.—p. 510.
Ectopic Gestation. W. C. Spackman.—p. 511.
Congenital Dilatation of Fetal Urinary Bladder. P. C. Das.—p. 513.
Some Notes on Planocaine in Spinal Analgesia. J. F. Robinson and T. Seshachalam.—p. 515.

Mechanism of Immunity in Malaria.—Stott discusses two cases of malaria which showed severe malignant tertian infection with a rate of approximately 50 per cent of the red cells infected and numerous sporulating bodies in the peripheral circulation. It is possible, therefore, that the mononuclear phagocytosis of parasites normally takes place in the fixed reticulo-endothelial cells, which become "unfixed" or "free" in the blood only in the severest infections when there is an excessive stimulation of these reticulo-endothelial cells. The appearance of sporulating bodies in the blood observed in these cases is further evidence of the severity of the infection, for this phenomenon also usually takes place in the recesses of the reticulo-endothelial tissues. The clinical jaundice that was present is a reflection of the severe destruction of the red cells by the malarial parasites. As regards the type of parasite phagocytosed, sporulating bodies were far more frequently observed in the mononuclear cytoplasm than ring parasites. It was easy to recognize such sporulating bodies when they were still within a phagocytosed red cell. It was frequently a matter of conjecture whether bodies of the size of individual spores scattered throughout the cytoplasm were or were not the semidigested remnants of a previously phagocytosed sporulating body. It could not be expected that the typical blue and red spore staining would be recognized in such a semidigested state, but the closer the number of such bodies approximated to fourteen and the more bunched they were together, the more likely it was that they were spore remnants. Sometimes the phagocytosed malignant tertian rings were within phagocytosed red cells and sometimes they were free in the mononuclear cytoplasm. Probably such free rings were mostly left behind after the red cell had been digested—but several such rings were free in the cytoplasm unsurrounded by any unstained vacuole and, moreover, they showed an excellent staining reaction and not a washed out or indiscriminate stain, which one might expect if the ring was semidigested. It is possible, therefore, that merozoites may at times be phagocytosed directly from the serum, after leaving the breaking down red cell containing a sporulating body and before reaching a new red cell —and may indeed develop to some extent in the mononuclear cytoplasm itself. There is no doubt that small rings are found in large mononuclears, not surrounded by a vacuole and giving the impression of health and vigor rather than of semidestruction from digestion, by reason of their distinctive chromatin and protoplasmic staining reaction. Large mononuclear cells

may therefore show their phagocytic power in malaria, even in the peripheral circulation of severe human cases, by the presence of (1) pigment, (2) rings and (3) red cells, normal or dehemoglobinized and infected or noninfected with sporulating or, less commonly, with other forms of malarial parasites.

Operation for Drainage of Pleura.—Fraser describes an operation which was originally designed for a case of malignant growth of the pleura in which the effusion collected so rapidly that aspiration had to be repeated every twenty-four hours. He decided on continuous drainage. Under local anesthesia with a 5 per cent solution of procaine, the skin and the tissues right down to the periosteum of the eighth rib in the mid-axillary line were infiltrated and an incision was carried right down to the bone, 1½ inches in length. An ordinary mastoid retractor was then inserted to hold back the soft tissues and the periosteum cleared from the rib over about one-half square inch. A trephine corresponding in diameter to the largest size tracheotomy tube was then used to make a hole through the center of the rib. Through the hole thus made the pleura was infiltrated with procaine, after which a pair of sinus forceps was inserted through the soft structures and the pleural cavity opened. The blades of the forceps were opened and rotated within the hole to tear the pleura open for admission of a tracheotomy tube. Only one tube was used and its curved end was directed downward; it entered smoothly and lay snugly flush with the rib, to which it was fastened by a silk suture through the periosteum. On removal of the mastoid retractor, the soft tissues closed in to some extent and the gap left was lightly plugged with sterile gauze to exclude air but to allow free drainage. The author believes the advantages of this method are: 1. The small size of the wound and initial incision. 2. The bloodlessness of the method if epinephrine is used with procaine hydrochloride. 3. The absence of mutilation of the rib. 4. No projection from the wound by way of drainage. 5. Absence of irritation of the pleura or reflex coughing, with the tracheotomy tube lying flush against the wall of the thorax within. 6. The rapidity of the method compared with resection of a rib.

Journal of Physiology, London

70: 121-238 (Sept. 4) 1933

Physiologic Significance of Weber's Law and Color Contrast in Vision. J. S. Haldane.—p. 121.
Effect of Estrin on Reactivity and Spontaneous Activity of the Rabbit's Uterus. J. M. Robson.—p. 139.
Simple Photo-Electric Colorimeter. G. A. Millikan.—p. 152.
Kinetics of Blood Pigments: Hematocyanine and Hemoglobin. G. A. Millikan.—p. 158.
Ovulation After Blood Dilution and Cross Circulation. M. K. McPhail, A. S. Parkes and W. E. White.—p. 180.
Retinal Action Potential of the Human Eye: Note. Sybil Cooper, R. S. Creed and R. Granit.—p. 185.
Albuminuria in Normal Male Rat. Muriel E. Bell.—p. 191.
Diffusion of Lactate in and from Muscle. S. C. Devadatta.—p. 194.
Isolated Mammalian Heart Preparation Capable of Performing Work for Prolonged Periods. I. de B. Daly and W. V. Thorpe.—p. 199.
Influence of Parathyroid on Metabolism of Creatine and Phosphoric Acid. C. G. Imrie and Constance N. Jenkinson.—p. 218.
*Excretion of Prolan After Intravenous Injection in Rabbit. A. S. Parkes and W. E. White.—p. 226.
Extra-Uterine Survival of Spermatozoa. W. E. White.—p. 230.
Histamine in Canine Gastric Tissues. Gertrude Gavin, E. W. McHenry and M. J. Wilson.—p. 234.

Excretion of Prolan.—Parkes and White injected 30, 50 and 100 mg. of prolan into gonadectomized rabbits, or about three, five and ten times the amount required to produce ovulation with certainty in an estrous animal. After prolan injection, urine was collected for times up to nine hours. Collection for more than nine hours produced highly toxic samples. Of two animals receiving 30 mg. of prolan, one gave active urine nine hours later, so that rather less than one third of the hormone appears to have been excreted during this time and recovered. Of two tests on one fourth of the urine obtained nine hours after the injection of 100 mg. of prolan, one was positive and the other negative. In other experiments, injection of all the urine and also of half of the urine collected nine hours after injection of 100 mg. produced positive reactions. These results suggest that about one third or less of the material is excreted in nine hours. It would thus appear that the blood threshold, if any, which the hormone must attain before excretion can begin is comparatively low. The results suggest that excretion continues up to nine hours. Thus, in the groups receiving 30 and 50 mg. of prolan the urine appears to be more active after nine than after six or seven hours. After the administration of 100 mg. of prolan, active urine was obtained during the first three and also between three and nine hours. The authors state that a pregnant woman excretes from 500 to 1,000 rabbit units of prolan a day, or, roughly, 10 units a day per kilogram of body weight. The amount which can be excreted by a rabbit is therefore of the same order as that which actually is excreted by a woman. It may thus be concluded that the failure of the pregnant rabbit to excrete prolan is due not to an inability on the part of the kidneys but more probably to the lack of the hormone in the blood.

Lancet, London

2: 573-626 (Sept. 9) 1933

Chemical Organization in the Living Cell. G. Hopkins.—p. 573.
Oral Cancer in Betel Nut Chewers in Travancore: Its Etiology, Pathology and Treatment. I. M. Orr.—p. 575.
*Laboratory Diagnosis of Typhoid Infections. A. Compton and I. A. Said.—p. 580.
Hypertensive Encephalopathy in Nephritis. H. Evans.—p. 583.
*Treatment of Scurvy in Man with Intravenous Injection of Ascorbic Acid. P. Schultzer.—p. 589.
*Method for Increasing the Sensitiveness of the Wassermann Reaction. R. W. Fairbrother.—p. 590.

Laboratory Diagnosis of Typhoid Infections.—In order to determine the practical value of Felix's method of differentiating between inoculation and infection agglutinins, Compton and Said tested, without any special selection, some seventy blood specimens sent to their laboratories for routine Widal examination during nine consecutive months of 1931. To this end they supplemented their two ordinary methods of laboratory serodiagnosis: (1) hemoculture with the clot and (2) quantitative macroscopic agglutination toward H emulsions of T, A and B organisms with the serum, by (3) testing in addition the agglutinating action of the serum against an O emulsion of T. They observed that in the presence of negative and nondiagnostic (1/50) results of sero-agglutination the diagnosis is improved by approximately 4 per cent when a sensitive phenolated O emulsion is included in the technic of the Widal test. It is improved by approximately 10 per cent when systematic hemocultures are carried out with all specimens, the clots being utilized to this end. Whether a serodiagnosis improved to the extent of 4 per cent may or may not be thought a justification for complicating laboratory reports with the vaguer diagnosis of "enteric group" infection is an open question. The bacteriologist and the clinician can only decide that between them. The greater improvement and precision of laboratory diagnosis arising from the systemic carrying out of hemocultures cannot be sufficiently insisted on. Yet this is far from being the general practice of laboratories in Egypt. In the authors' experience, practitioners do not avail themselves sufficiently of the help which the laboratory can afford by bacteriologic examinations of specimens of feces and urine in obscure typhoid conditions characterized by negative or doubtful Widal results. The agreement of 10 per cent of Widal positive specimens showing supplementary evidence of the presence of inoculation agglutinins and the calculated approximately floating proportion of 10 per cent of the population being inoculated within two and one-half years is striking.

Ascorbic Acid in Scurvy.—Schultzer presents a case of scurvy in a man of 68 who was cured with ascorbic acid. The daily intravenous injection of 40 mg. of ascorbic acid resulted in rapid recovery from the scurvy. He believes it doubtful whether the 40 mg. of ascorbic acid if given by mouth would have produced the same effect, especially in view of the fact that the patient suffered from gastric achylia.

Sensitiveness of the Wassermann Reaction.—Fairbrother investigated the practicability of Wyler's modified reaction of the Wassermann reaction in a laboratory, in which some 500 serums are examined weekly. Various serums giving either negative or doubtful results when tested by his usual laboratory technic were selected for examination. This consisted of a further test, in which increased strengths of serum were used. He observed that undiluted (1:1) serum was unsatisfactory, owing to the fact that (1) in several instances

at this strength the serum exhibited distinct anticomplementary properties and (2) that the amount of serum required for the test was too large for the many specimens received. Therefore it was decided to compare the results obtained with a large series of serums diluted 1:2 and 1:5. The results obtained support the assertion of Wyler that the sensitiveness of the Wassermann reaction can be increased without loss of specificity by increasing the quantity of the serum to be tested. For routine work, however, it is necessary that a definite dilution or series of dilutions should be adopted. An increase in the sensitiveness of the reaction is a most useful step, especially in treated cases. One objection might be that another serum dilution in the quantitative method would make the test too cumbersome. This may be so, but it seems preferable to replace the largest dilution, such as 1:45, and substitute a dilution of 1:2. Thus a series of dilutions of 1:2, 1:8 and 1:32 would be more valuable than a series of 1:5, 1:15 and 1:45.

Medical Journal of Australia, Sydney

2: 299-332 (Sept. 2) 1933

Contracted Pelvis. J. S. Green.—p. 299.
*Hypoglycemic Angina: Report of Five Cases. C. Sippe.—p. 302.
Ocular Torticollis: Inferior Oblique Tenotomy and Its Indications. E. T. Smith.—p. 307.
Blow Fly Problem. W. M. Sinclair.—p. 308.
Chronic Paronychia Due to Monilia. I. Connor.—p. 312.
Repeated Lumbar Puncture in Epilepsy. A. T. Edwards.—p. 314.

Hypoglycemic Angina.—Sippe states that it has been said that a blood sugar reading of 0.08 per cent does not constitute sufficient evidence to warrant a diagnosis of hypoglycemia. On the other hand, undoubted symptoms of hypoglycemia can occur when the blood sugar is much higher. In his experience a blood sugar reading of 0.08 per cent should always be looked on with suspicion. The diagnosis is verified by the clinical history and the therapeutic test which follows the administration of dextrose. The person with acetonemia lacks the power of utilizing the dextrose obtained from an average diet and needs the addition of dextrose as well as a reduction of the intake of fat in spite of a normal blood sugar. It would appear that the changes in the electrocardiographic record must now be regarded as giving important diagnostic criteria in hypoglycemia and acetonemia and afford a valuable indication of the results of treatment. The importance of this observation is obvious, since failure to recognize the condition and to institute appropriate treatment has left the way open for the diagnosis of coronary thrombosis with its grave prognostic significance. The author describes four cases of hypoglycemia and one of ketosis which showed anginal symptoms suggestive of cardiac disease. The electrocardiograms showed characteristic changes. The author concludes that changes in the cardiac muscle are only one of the many manifestations of hypoglycemia and ketosis. A great deal of evidence has been collected to show that these conditions are of extreme importance in the production of sinusitis and nontuberculous pulmonary fibrosis. The electrocardiographic changes in hypoglycemia and ketosis consist of any of the following combinations: (1) flattening or inversion of the P waves, (2) low voltage QRS complexes, (3) depression of the ST interval, (4) flattening of the T waves.

Practitioner, London

131: 221-324 (Sept.) 1933

Birth Control: Introduction. Horder.—p. 221.
Id. H. Ellis.—p. 228.
Ethics of Birth Control. E. A. Barton.—p. 239.
Is the Practice of Contraception Injurious to Health? E. Holland.—p. 247.
Choice of a Contraceptive. C. P. Blacker.—p. 256.
Contraceptive Methods: Description of Museum in the London School of Hygiene and Tropical Medicine. C. I. B. Voge.—p. 268.
Birth Control in Practice: (I) General Practice: (II) The National Movement. E. F. Griffith and Helena Wright.—p. 278.
Small Birth Control Center: Notes. Alice L. L. Robson.—p. 286.
Therapeutic Aids to Diagnosis. J. W. Linnell and H. A. Dunlop.—p. 288.
Treatment of Infections of the Urinary Tract. T. E. Hammond.—p. 296.
*Syphilis of Esophagus. E. Watson-Williams.—p. 310.

Syphilis of Esophagus.—Watson-Williams describes four cases of syphilis of the esophagus and two in which that diagnosis appeared correct. Dysphagia was the first symptom; four of the six showed wasting, and only one had real pain. The local appearances include: (1) general esophagitis tending to affect the middle two fourths of the esophagus, but in one case the whole, (2) maceration of the epithelium, with longitudinal desquamation going on to complete shedding of the epithelium and (3) formation of leukoplakic patches consisting of thickening of the epithelium only. In 350 consecutive esophagoscopies the appearance of general esophagitis affecting the middle two fourths of the esophagus and maceration of the epithelium were not seen except in the six cases described. There were eleven cases of aneurysm causing dysphagia during the period covered by these esophagoscopies.

South African Medical Journal, Cape Town

7: 603-638 (Sept. 23) 1933

Combined Anesthesia in Surgery. F. D. du T. Van Zyl.—p. 605.
The Mechanism of Allergy. W. P. Mulligan.—p. 616.

Presse Médicale, Paris

41: 1877-1900 (Nov. 22) 1933

Work of Pasteur. Pasteur Vallery-Radot.—p. 1877.
Rôle of Amino Acids in Evolution of Experimental Ulcer: Influence of Histidine. A.-G. Weiss and E. Aron.—p. 1880.
*New Sign of Lumbago. G. S. Demianoff.—p. 1883.

Sign of Lumbago.—Demianoff describes a sign that permits the differentiation of pain originating in the sacrolumbalis muscles from lumbar pain of any other origin. The sign is obtained by placing the patient in dorsal decubitus and lifting his extended leg. In the presence of lumbago this produces a pain in the lumbar region which prevents raising the leg high enough to form an angle of 10 degrees, or even less, with the table or bed on which the patient reposes. The pain is due to the stretching of the sacrolumbalis. To make certain that the pain is not due to sciatica (Lasègue's sign), the patient's leg is lifted a second time. This time the physician fixes the pelvis on the same side by pressing heavily with his hand on the region of the homolateral anterior superior iliac crest. The fixation of the pelvis prevents the stretching of the sacrolumbalis and permits raising the leg to an angle of 90 degrees without, or practically without, the production of lumbar pain. If the pain produced by raising the leg is due to sciatica it is not suppressed by fixing the pelvis, as this does not prevent the sciatic nerve from being stretched. The more acute the angle (between the leg and the table) at which lumbar pain is first experienced, the more severe is the involvement of the sacrolumbar muscle. The test should be performed on both legs. This sign of lumbago is usually manifest on both sides but the angle to which the legs can be raised may vary, as the muscle pain may be more intense on one side. If lumbago and sciatica coexist on the same side, the author's sign is negative on that side but it will be positive on the other side. In the rare case of simultaneous lumbago and sciatica on both sides the author's sign will be excluded by Lasègue's sign.

Policlinico, Rome

40: 721-804 (Nov. 1) 1933. Medical Section

Mercury, Bismuth, Arsenic and Iodine in Treatment of Cardiovascular Syphilis. G. Sabatini.—p. 721.
Clinical Roentgenologic Study of Pulmonary Vascular Pattern in Normal and Pathologic Conditions. Gastone Meldolesi and Gino Meldolesi.—p. 738.
*New Clinical Picture of Atypical Purpura Hemorrhagica Associated with Nodular Tuberculosis of Spleen. A. Omodei-Zorini.—p. 790.

Atypical Purpura Hemorrhagica.—Omodei-Zorini made a study of two women patients presenting atypical purpura, nonthrombopenic but thrombasthenic in type, associated with nodular tuberculosis of the spleen. The two patients developed hemorrhages of the skin and mucosas during premenstrual periods and during the spring season, and one of them also showed hemoptysis. In both cases the tuberculosis was latent and the spleen was involved in the form of chronic miliary tuberculosis in one patient and of an isolated caseous nodule in the other. In the second patient the author was able to isolate a tuberculous strain of attenuated virulence and of human origin. He believes that two concomitant factors account for this condition: a predisposing congenital factor of thrombasthenia and an acquired toxic infective tuberculous factor. In both cases the splenectomy interrupted the produc-

tion of tuberculous toxin and helped to stop the hemorrhagic manifestations. Tuberculin treatment reduced the fever and finally aided in establishing a lasting cure.

Medizinische Klinik, Berlin

29: 1463-1502 (Oct. 27) 1933

*Protracted Radium Treatment of Inoperable Carcinomas of Rectum. H. T. Schreus.—p. 1463.
*Roentgen and Radium Irradiation of Inoperable Ovarian Carcinomas. E. Vogt.—p. 1464.
Topography of Calcified Lymph Nodes in So-Called Hilus Shadow. G. Herrnheiser.—p. 1466.
Task of Practitioner in Roentgen Therapy. F. Bardachzi.—p. 1470.
Humeroscapular Periarthritis. W. Altschul.—p. 1474.
Efficiency of Stereogrammetric Measurement of Pelvis in Borderline Cases of Narrow Pelvis. R. Dyroff.—p. 1475.
Methods and Practical Application of Stereoscopic Examination of Roentgenograms in Internal Medicine. W. Teschendorf.—p. 1478.
Benign Esophageal Polyp and Malignant Gastric Polyp. A. Beutel.—p. 1482.
Estimation of Roentgenomorphologic Observations in Gastroduodenal Diagnosis, Particularly in That of Prepyloric Region. G. Steiner.—p. 1484.
Polydactylism: Clinical Aspects and Etiology. Lilly Pokorny.—p. 1486.
Os Acromiale. H. Gurniak.—p. 1488.
Development of Concept of Dose in Roentgen Therapy. H. Holthusen.—p. 1489.

Radium Treatment of Inoperable Carcinomas of Rectum.—Schreus resorted to protracted roentgen irradiation and to radium treatment by contact in inoperable carcinomas of the rectum and in those no longer amenable to radical ray treatment. The radium is applied in the intestine. Since strong reactions are not desired, the author gives a first dose of from 500 to 600 mg. element hours by means of a brass container 3 cm. in length and having a wall thickness of 1 mm. The radium container is introduced with the aid of the rectoscope and is fixed in place by adhesive tape. The radium is introduced from three to four times, at intervals of from eight to ten days. This procedure generally produces a mild reaction on the mucous membrane and often a noticeable retrogression of the carcinoma. After from two to three months, a new series of radium treatments may be given. This treatment may be combined with protracted roentgenotherapy according to Coutard's method with a focal dose of from 2,000 to 4,000 roentgens. In order to avoid severe reactions, frequent controls with the rectoscope are advisable. The author found that favorable palliative results may be produced with this method, for not only do the hemorrhages cease and does the tumor decrease but the patient's general condition also improves. Cicatrization may produce strictures that necessitate the formation of a preternatural anus. The author's results were such that an artificial anus could be dispensed with. He is unable to say to what extent the protracted roentgen-radium treatment would prove useful in cases that are not yet as far advanced as those treated by him. He thinks that surgical treatment with subsequent prophylactic irradiations should be the method of choice in operable cases but that in the more advanced cases the described method is the best, since it is sufficiently effective and yet preserving.

Irradiation of Ovarian Carcinomas.—According to Vogt the surgical treatment of operable ovarian carcinomas is generally followed by a prophylactic roentgen irradiation with the full carcinoma dose given as soon as the wound is healed. In case of a relapse the carcinoma dose is again applied, but the interval between the roentgen treatments should be at least three months. In exceptional cases a third carcinoma dose of roentgen rays may be given after another three months. The incompletely removed ovarian carcinomas, or the inoperable ones, the inoperability of which has been established by exploratory laparotomy with biopsy and microscopy, are treated by the author with a combination roentgen-radium treatment. From three to four weeks after the operation, radium (from 1,800 to 2,200 mg. hours) is introduced into the uterus. A few days later this is followed by roentgen irradiation with the full carcinoma dose. The second intra-uterine radium treatment is given six weeks after the first, and the third is given after another six weeks. This third radium treatment is again followed by an irradiation with roentgen rays. The author gained the impression that the combined roentgen and radium treatment gives better results than the roentgen irradiation alone, and he recommends the application of this method.

Münchener medizinische Wochenschrift, Munich

80: 1765-1804 (Nov. 10) 1933

*Intestinal Helminths and Their Extra-Enteral Occurrence, Especially During Childhood. H. Brüning.—p. 1765.
*Diagnostic Significance of Sedimentation Reaction in Acute Infectious Diseases. H. Curschmann.—p. 1767.
Significance of Diseases in Animals for Human Pathology. K. Poppe.—p. 1768.
*Bacteria of Chicken Enteritis and Atypical Forms of Gärtner's Bacillus in Gastro-Enteritides Caused by Foods Prepared with Eggs. R. Müller.—p. 1771.
*Treatment of Pernicious Anemia with Duodenal Juice. W. Kühnau.—p. 1772.
Difficulties in Diagnosis and Prognosis in Psychiatry. M. Rosenfeld.—p. 1774.
Diagnosis and Treatment of Gastric and Duodenal Ulcers. H. Schlecht.—p. 1779.
Localization and Differentiation of Metal Splinters in Human Organism by Means of Amplifier. W. Comberg.—p. 1783.
Treatment of Exophthalmic Goiter with Ergot. K. Müller.—p. 1784.
Releasing of Tension in Treatment of Lead Paralysis. A. Schlick.—p. 1785.
Nervous Disturbances and Prevention of Invalidism by Combined Physical and Psychotherapeutic Methods. A. Hanse.—p. 1786.

Intestinal Helminths and Their Extra-Enteral Occurrence.—Brüning mentions several types of Taenia, Ascaris lumbricoides, Oxyuris vermicularis and Trichocephalus dispar as the helminths most frequently found in the Baltic provinces of Germany. He points out that the complications which may be caused by these helminths make it necessary to expel them. For the expulsion of Taenia he recommends extract of male fern, and he treats ascariasis, oxyuriasis and trichocephaliasis with oil of chenopodium. However, these anthelmintics are effective only as long as the helminths are present in the gastro-intestinal tract, for these intestinal parasites may also lead an extra-enteral existence. The larvae of ascarides, for instance, may pass through the veins of the intestinal tract to the liver, into the heart and lungs, and up the bronchi until they reach the pharynx. After being swallowed, they again enter the gastro-intestinal tract, in which they grow into the adult form. Such an extra-enteral course of development is not known about Oxyuris and Trichocephalus, and the extra-enteral occurrence of Taenia is a great rarity, although cases have been reported in which a tapeworm was found in the gallbladder and even reached the liver. The occurrence of Taenia in the abdominal cavity or in an abscess of the abdominal walls likewise has been reported. From the duodenum, ascarides occasionally enter into the biliary tract. Occasionally they penetrate the intestinal wall, particularly, in cases of ulceration or following operations, and then cause peritonitis; but there is also some evidence that even the intact intestinal wall may be penetrated by Ascaris. Oxyuris has been found in the surroundings of the anus or of the genitalia, or in the region of the coccyx, for it is known that the females emerge from the intestine to deposit their eggs. Through the vagina they may travel upward and reach the oviducts or the peritoneum. Extra-intestinal occurrence of Trichocephalus is not known. The author thinks that, in most instances of extra-enteral occurrence of helminths, cure can be effected by surgical treatment.

Sedimentation Reaction in Acute Infectious Diseases.—Curschmann reports his experiences with the sedimentation reaction in a number of acute infectious diseases. In typhoid the sedimentation speed was either reduced or normal during the first week. During the second week there usually developed an acceleration, which persisted during the third, fourth and fifth weeks. During the sixth week the values decreased, to remain only slightly accelerated, and this slight acceleration frequently persisted throughout a prolonged convalescence. Paratyphoid was characterized by similar changes. In Alcaligenes abortus infection the author gained the impression that in the first stages the sedimentation is either low or normal and that during the subacute or chronic stages it is usually increased. He considers the sedimentation reaction a valuable aid in the diagnosis of Alcaligenes abortus infection, for the low sedimentation during high fever is even a more frequent symptom than is leukopenia with lymphocytosis and monocytosis. Observations on cases of dysentery convinced him that in this disorder the sedimentation speed is of no particular value. In scarlet fever, he found it more uniform. The sedimentation was considerably increased at the onset. Uncomplicated cases

showed a decrease as soon as the fever decreased and, with advancing convalescence, normal values were reached again gradually. A persistence of the high values or a further increase during the time when the fever was decreasing indicated a complication or a superinfection. Measles was characterized by a high sedimentation speed at the beginning, but, as soon as the exanthem faded and the temperature fell, there was a rapid decrease, except when complications developed, in which case the sedimentation either remained high or increased again. During the first stages of the various forms of tonsillitis or of diphtheria, it was observed that the sedimentation did not increase as rapidly as did the number of leukocytes. Leukocytosis and deviation to the left are therefore of greater diagnostic value than the sedimentation reaction. At the severest stage of these infections, the sedimentation and the leukocyte formula showed practically the same behavior, but during convalescence it could be observed that an increased sedimentation often persisted for a considerable time after the fever, leukocytosis and deviation to the left had disappeared.

Gastro-Enteritides Caused by Eggs.—Müller discusses his studies on micro-organisms resembling those of typhoid, but nonmotile, like those of dysentery. He made two cultures from the feces of patients who developed gastro-enteritis after eating potato salad and blood sausage, and two from the ingested foods. He found that the four cultures were of the type Bacterium gallinarum, which is the cause of chicken enteritis but so far has not been considered pathogenic for human subjects. However, it is known that this bacterium has four variants, and further studies disclosed that the four cultures were of the type referred to as Shigella pfaffi. Of four chickens that were fed with the cultures, three died in less than five days, and the pathogenic micro-organism was isolated from their heart blood; one of the animals recovered. The author concludes that the potato salad eaten by the patients contained infected eggs. The presence of bacteria in hen's eggs was demonstrated as far back as 1911, and their pathogenicity for human subjects has been denied by some but demonstrated by others. The author thinks that febrile diarrheas of this origin may have been overlooked so far, because of their mild course, or a thorough bacteriologic investigation may have been neglected. He relates cases of gastro-enteritis in which atypical forms of Gärtner's bacillus were the cause. The food that caused the disturbance had been prepared with the fresh white from a hen's egg and with the white of a duck's egg that had been kept for several days. The author thinks that the latter was the source of the infection, and he assumes that the storage of the egg white, by permitting a multiplication of the organism, was an essential factor. He also cites other reports on the transmission of enteritis organisms (types Gärtner or Breslau) by eggs from ducks or chickens.

Treatment of Pernicious Anemia with Duodenal Juice.—In comparing the value of liver therapy and of stomach preparations, Kühnau points out that extracts of the gastric mucous membrane are as effective as the best liver preparations and that in cases of funicular myelitis the stomach extracts are even superior. The fact that in pernicious anemia not only the chemistry of the stomach but also the function of the duodenum and of the entire small intestine is impaired justifies the question whether the upper portions of the intestine do not produce an antianemic principle. Studies on this problem have given contradictory results, but the author reasons that it ought to be possible to compensate for the cessation of the production of ferment in the duodenum during pernicious anemia by the administration of normal duodenal juice. Moreover, the duodenal juice always contains some bile and there is a possibility that the antianemic principle of the liver is carried with the bile into the intestine, so that the duodenal juice ought to be doubly rich in the antianemic principle. The author resorted to the administration of normal duodenal juice in cases of pernicious anemia which proved refractory to liver therapy and in which the anemia had become extremely severe. After the production of duodenal juice has been stimulated in a healthy subject, from 40 to 200 cc. of it is withdrawn by means of the duodenal tube, and, with the aid of a stomach tube, this juice (200 cc.) is introduced into the stomach of the anemia patient. Then 5 cc. of diluted hydrochloric acid and two teaspoonfuls of dextrose are mixed in 200 cc. of water, and this mixture is given to the patient. The procedure is comparatively simple and vomiting is never observed. On the basis of results obtained with this method, the author concludes that in cases in which other methods fail this procedure may yet be effective. He suggests that the duodenal juice at first be given three times each week, and later, after some improvement has been obtained, once a week.

Zeitschrift für Kinderheilkunde, Berlin

55: 479-638 (Oct. 23) 1933

Clinical Studies on Erythrocytes with Supravital Granulation in Children's Disorders. M. Kasahara, T. Tsuda and M. Nagahama.—p. 479.
Pulmonary Infiltrations of Allergic Origin During Childhood. H.-U. Köttgen.—p. 483.
Peculiarities of Carbohydrate Metabolism in Nurslings and Children. W. Heymann and Elisabeth Maier.—p. 502.
Disturbances in Phosphate Metabolism During Rickets. W. Heymann and Elisabeth Maier.—p. 512.
Significance of Antitoxin in Pathogenesis, Prophylaxis and in Recovery from Diphtheria and Diphtheria Relapses. P. Zoelch.—p. 518.
*Dangers of Overdosage of Borderline Rays in Growing Organism. Mathilde Kolrep.—p. 546.
*Investigations on Immunity in Whooping Cough. A. Kairies and Sigrid Goetze.—p. 551.
Reticulocytes and Their Clinical Significance During Childhood. Lili Michaelis.—p. 567.
Studies on Lead Poisoning in Nurslings and Small Children: Clinical and Experimental Investigations on Passage of Lead into Milk. M. Kasahara and S. Nosu.—p. 577.
Id.: Lead Anemia in Nurslings and Small Children. M. Kasahara and M. Nagahama.—p. 583.
*Metabolic Studies in Glycogen Storage Disease. W. Hertz.—p. 588.
Metabolic Processes in Acetonemic Vomiting: Acetonemic Vomiting and Hypochloremia. H. Biedermann and Duken.—p. 602.
Id.: Acetonemic Vomiting and Carbohydrate Metabolism. H. Biedermann.—p. 613.
Colic Due to Renal Calculi During Early Childhood. W. Behrens.—p. 637.

Dangers of Overdosage of Borderline Rays.—Kolrep's irradiation experiments on young rats corroborate former tests, in that they demonstrate that borderline rays are not harmless. If applied in large doses, they inhibit the growth of bones. A tabular report indicates that an injurious effect may become manifest after the application of a total dose of 2,000 roentgens. However, a sure impairment of the bone growth in all animals requires a total dose of from 3,200 to 3,500 roentgens. Another table indicates that irradiation begun at an early age apparently produces no greater impairment of bone growth than is the case if irradiation is begun in slightly older animals. The irradiation with the large doses produced a temporary epilation. The latter was the more pronounced in animals in which the intervals between irradiations were short. In the evaluation of these tests the author points out that roentgen rays may cause impairment of the growth of bones. She reviews experiments which indicate that the harmful dose is much lower for roentgen rays than for borderline rays, but, although the therapeutic dose of the borderline rays is much higher than that of roentgen rays, sight should not be lost of the fact that borderline rays may become harmful if given in excessive doses, and particular care should be taken whenever the growth zones of bones are exposed to irradiation.

Investigations on Immunity in Whooping Cough.—Kairies and Goetze made studies on fourteen children having whooping cough and on fourteen healthy children who had been vaccinated against whooping cough. They found that the complement fixation reaction with the Bordet-Gengou bacillus was strongly positive in thirteen children having whooping cough and that it was doubtful in one child. Antibody formation was not demonstrable in four healthy nurslings who had been vaccinated, but complement fixing antibodies were demonstrable beginning with the eighth day after the first injection of vaccine in all children who were vaccinated after they had passed the first year of life. The reactions reached their maximum between the tenth and twenty-fifth days. In four of the children the complement fixation reaction had become negative again five weeks after the first injection. The serologic conditions seem to indicate that, particularly in nurslings, the prospects of a successful vaccination are doubtful. On the basis of theoretical considerations, the vaccination of children presenting allergic reactions, of those whose defense mechanism is impaired, and

of those suffering from other bacterial infections, should be dispensed with. Complement fixation reactions with the Bordet-Gengou bacillus may occur also in the serum of patients having disorders other than whooping cough. Moreover, the serum of children vaccinated with Bordet-Gengou bacilli may give temporarily nonspecific reactions with Wassermann antigens, gonococcus vaccines, staphylococci, colon bacilli and influenza bacilli. The occurrence of nonspecific reactions is largely dependent on the reaction capacity of different individuals. A better differentiation of the various receptors that are contained in the serum can probably be effected by an elective absorption.

Metabolic Studies in Glycogen Storage Disease.—Hertz made metabolic studies on a boy, aged 11, who has glycogen storage disease (called also glycogenosis, von Gierke's disease and so on) and who has been under observation for several years. It was found that the nitrogen exchange was not increased. The amino acid metabolism was normal, and the gelatin-water tolerance test (according to Morawitz-Mancke) disclosed no abnormalities. These observations are important for the differentiation of glycogenosis from cirrhotic disturbances of the liver. The results of the liver tolerance tests with amino acids on the one hand, and with insulin-sugar-water (Althausen-Mancke) on the other hand, correspond to each other, and the prolonged increase in the fat content of the blood following a fat tolerance test in patients suffering from glycogenosis likewise agrees with this. The creatine-creatinine elimination was found to be unusually high. The examination of the blood serum and of the urine revealed a temporary acidotic tendency in the metabolism. The water exchange was not noticeably disturbed in this case of glycogenosis, although other patients having glycogenosis have shown an abnormal water economy. The author reaches the conclusion that in glycogen storage disease it is not so much the liver that is diseased but that there is a disturbance in the metabolism, which brings into prominence the storage of glycogen in the liver and in other organs. In the metabolic equilibrium there is a shifting toward polymerization. An increased elimination of urobilin bodies, which is the most exact indicator of impairment of the liver, has never been observed in glycogenosis.

Zeitschrift für klinische Medizin, Berlin

125: 387-564 (Oct. 23) 1933

*Electrocardiographic Studies in Hyperthyroidism. B. Misske and G. Schöne.—p. 387.
High Position of Electric Axis of Heart. E. Flaum and F. Nagl.—p. 414.
Epidemiology of Haff Disease. H. Habs.—p. 431.
Early Cardiac Syphilis. J. von Fernbach.—p. 453.
Studies on Mechanism of Pale Hypertension. H. Bohn.—p. 458.
Effect of Heparin on Sedimentation Rate of Blood. K. L. Zirm and G. Scherk.—p. 475.
Kymographic Studies of Normal Heart. W. Brednow and U. Schaare.—p. 480.
*Pathogenesis of Sense of Anxiety in Angina Pectoris. E. Hausner and H. Hoff.—p. 493.
Mechanism of Oxygen Inhalation. K. Hinsberg and A. Rühl.—p. 508.
Idem. K. Hinsberg, G. Hoppe and A. Rühl.—p. 518.
Metabolic Studies in Congenital Myotonia. J. Friesz and E. Mohos.—p. 532.
Diagnosis and Pathogenesis of Atrophy of Spleen. H. Hirschfeld and L. Dünner.—p. 536.
*Cardiac Complications of Grip. E. Egedy.—p. 547.
Mechanism of Alimentary Blood Sugar Curve After Double Tolerance Test. C. V. Medveri.—p. 554.

Electrocardiographic Studies in Hyperthyroidism.—Misske and Schöne report electrocardiographic studies in 113 patients with hyperthyroidism. The severity of a case was estimated by determination of the basal metabolic rate. The highest rate in any case was +107 per cent. Two hundred electrocardiograms were studied. Disturbances of the cardiac rhythm were frequent. The pulse varied between 70 and 130 per minute. Bradycardia with a pulse below 70 was observed in four patients; in one of these there was a pronounced hyperfunction of the thyroid and a basal metabolic rate of +42 per cent. Sinus tachycardia was noted in only five cases, all of which were typical instances of exophthalmic goiter with a basal metabolic rate ranging between 87 and 90 per cent. Sinus arrhythmia was found in practically all the graphs. Extrasystoles were rather unusual. There were two instances of auricular and two of ventricular extrasystoles. Auricular fibrillation was present in twelve cases. The disturbance disappeared after surgical removal of the thyroid. The authors were not able to influence fibrillation by internal therapy. Disturbances in conductivity were rare, only three cardiograms showing a blocking of the sinus impulse. The time of conduction between the auricle and the ventricle oscillated, in the majority of the cases, between 0.12 and 0.19 second. The authors did not see an instance of a complete block or of a disturbance of intraventricular conductivity. In their opinion, the duration of the systole was conditioned by the frequency of the pulse: the faster the pulse, the shorter the duration. The study of an individual complex revealed a rise of the P wave in thirteen graphs, of the T wave in thirteen and of the ventricular phase in twenty-nine. A simultaneous rise of the P and T waves was recorded in only six graphs. This is opposed to observations of previous workers who considered the simultaneous rise in the two waves characteristic of exophthalmic goiter. The authors have seen this sign quite frequently in neurasthenic persons. They have gained the impression that sinus arrhythmia is a fairly constant sign in thyroid hyperfunction. All the cases exhibiting fibrillation belong to the severest type of thyrotoxicosis, a fact suggesting that the damage to the heart was of a purely thyrogenous origin. No instance of permanent arrhythmia of the pulse was noticed in cases in which a thyroidectomy was performed. In one case, radium application was followed eight days later by fibrillation. The authors conclude that fibrillation of thyrotoxic origin is best treated by strumectomy.

Pathogenesis of Anxiety in Angina Pectoris.—Hausner and Hoff state that the relationship between the anxiety occurring in an attack of angina pectoris and in edema of the brain stem was suggested to them by the following clinical observations: A young man, in whom Denk removed a cyst of the left cerebellar hemisphere, developed four hours later a sense of anxiety and a feeling of impending death. This lasted four hours and disappeared without giving rise to any disturbance in the cardiovascular or the central nervous system. Two patients, in whom a cerebellar tumor was removed, developed shortly after the completion of the operation a sense of anxiety and of impending death. This was accompanied by bulbar signs, such as blurred and double vision and a characteristic disturbance of the speech. Both died a short time later. Postmortem examination revealed edema of the lower portion of the pons and of the medulla oblongata on macroscopic and microscopic studies. The similarity of their anguish to that of patients having an attack of angina pectoris was striking. The authors next report postmortem observations on nine patients whose death was caused by coronary thrombosis. Six of these exhibited symptoms of anguish during the anginal attacks and five presented an occlusion of the left coronary artery. In five of the six last mentioned, edema of the stem of the brain was found on macroscopic and microscopic examination. On the other hand, edema of the brain was not found in patients dying of various forms of cardiovascular disease other than angina pectoris. The authors ligated branches of the coronary artery in sixteen dogs and found edema on macroscopic and microscopic examination in ten. They feel that they have advanced sufficient proof to substantiate the suggestion that the feeling of anxiety and a sense of impending death occurring in an attack of angina pectoris are the result of edema involving the lower third of the pons and the medulla oblongata.

Cardiac Complications of Grip.—Egedy has studied 100 cases of grip since 1929 and found that twenty-seven of these exhibited signs of cardiac involvement. Of the twenty-seven patients presenting cardiac complications, twenty-one gave electrocardiographic evidence of the disorders. The study of these twenty-one patients revealed that approximately 50 per cent of the alterations were due to a lesion of the path of conduction and about 25 per cent to a lesion of the myocardium and the coronary arteries. These figures do not include instances of bradycardia for the reason that the author is not certain whether the latter is caused by the toxic blocking effect on the excitability of the sinus nodes or by extracardiac causes. He had not observed any lesion of the endocardium or of the pericardium. The cardiac symptoms not infrequently may have

their onset simultaneously with the onset of fever and be demonstrable in electrocardiograms. Approximately two thirds of all cardiac complications occur after the disease is over or still later during the convalescence. The author points out that physical examination alone is incapable of detecting many cardiac complications. Retardation of auricle conductivity as well as the appearance of atrioventricular rhythm will not give physical signs save for bradycardia and positive venous pulse in the latter. Mild lesions of the myocardium likewise do not produce physical signs. The electrocardiogram often reveals surprising information in this group of cases. The therapeutic indication in such cases is absolute rest. Intravenous injections of dextrose and cardiazol are of value. Strophantus and digitalis are exhibited in the presence of decompensation. The prognosis is favorable; all the symptoms disappear in from two to six weeks, and the sinus rhythm and cardiac activity return to normal.

Polska Gazeta Lekarska, Lwów

12: 865-888 (Nov. 5) 1933

Basal Metabolism in Intestinal Occlusion. J. Glatzel.—p. 865.
Clinical Observations in Serous Pleurisy. A. Landau, B. Glass and M. Markson.—p. 867.
*Ankylosis of Vertebral Joint Treated by Parathyroidectomy: Four Cases. J. Jasieński.—p. 869.
Adams-Stokes Syndrome After Wound of Heart. J. Zambrzycki.—p. 871.
Neuroma of Face. J. Sowiakowski.—p. 873.
Primary, Secondary Diphtheria, or Parasitism of Diphtheria Bacilli. A. Donhaiser.—p. 876.
Experience with Nupercaine. L. Gerhardt.—p. 877.

Parathyroidectomy in Ankylosis of Vertebral Joint.—Jasieński agrees with Leriche that the removal of the parathyroids in ankylosis of the vertebral joints is beneficial and should not be delayed even to await a rise in the calcium of the blood. He operated on four patients with ankylosis, three men and one woman, ranging in age from 27 to 45, in whom the duration of the ankylosis averaged fourteen months. Roentgenograms disclosed acute involvement of the processes of the vertebral joints, narrowing of some of the joints and the presence of ridges on the surfaces of some of the vertebrae. General examination of the patients revealed no changes in the respiratory tract, the circulation and the abdominal cavity. After operation the patients showed almost instant subjective and clinical improvement, which has persisted. In operating, the author endeavored to adhere strictly to the recommendations of Chifoliau and Ameline. He believes that their method is best, since the collar incision of Rocher permits both sides of the thyroid to be seen and allows observation of the parathyroids if found necessary.

Klinicheskaya Meditsina, Moscow

11: 715-814 (Nos. 15-16) 1933. Partial Index

Problem of Functional Diagnosis of Cardiac Insufficiency. D. D. Pletnev.—p. 715.
*Early Forms of Diseases of Liver: Hepatitides and Precirrhotic States. P. A. Barkhash.—p. 741.
Peptogenic Function of Liver: Its Rôle in Symptomatology and in Constitution. O. Sokolnikov and I. Retinitskiy.—p. 751.
Syphilitic Diseases of Liver. M. I. Kovalenok.—p. 770.
Pancreas and So-Called Hepatolienal Syndrome. V. Mikhelson.—p. 777.
Regarding So-Called Compensatory Loops of Duodenum. B. M. Shtern.—p. 781.
Combined Gynecologic and Gastro-Intestinal Disturbances. E. D. Moldavskaya-Svet.—p. 788.
Raw Apples in Treatment of Chronic Colitis with Diarrhea. L. B. Berlin, B. S. Levin and P. L. Isaev.—p. 793.

Diseases of Liver.—Barkhash emphasizes the intensive study of early forms of hepatic diseases with the view of preventing their passing into incurable types, such as cirrhosis or acute yellow atrophy. The early diagnosis of hepatic disease is made difficult by the absence of reliable functional tests. As a minimum of laboratory investigation in the study of hepatic function the author suggests (1) determination of galactose in the urine and of sugar tolerance after dextrose and levulose, (2) determination of the amino-acids in the blood and urine, (3) determination of bilirubin and cholesterol in the blood, (4) determination of biliary acids in the urine and of bile pigments in the urine and in the blood, (5) roentgen study of the gastro-intestinal tract and cholecystography and (6) esophagoscopy (for the detection of varices). A careful history is of the greatest importance. The early forms of hepatic disease are reversible and their timely recognition enables one to bring about the restoration of normal function. This is true not only of hepatitis without jaundice and with mild disturbance of hepatic function but of precirrhotic states with a profound disturbance of most of the liver functions as well. While isolated lesions of the liver or the bile tracts undoubtedly exist as such, more frequently the latter lead to the involvement of the liver, and vice versa. The author regards the so-called hepatolienal syndrome as a precirrhotic state which, not infrequently, passes into a typical cirrhosis of Laennec, the patient for a long time preserving fair health and working capacity. The most important therapeutic measure in chronic hepatitis and in precirrhotic states is a liver-sparing diet; e. g., one rich in carbohydrates and limited as to albumins.

11: 815-917 (Nos. 17-18) 1933. Partial Index

*Pathogenesis of Angina Pectoris. Ya. A. Kudrin.—p. 815.
Chronic Endocarditis and Valvular Lesions. V. I. Chilikin.—p. 829.
Venous Pressure in Constricted Extremity as Indicator of Mean Arterial Pressure. A. G. Tetelbaum, M. I. Krynskiy, O. F. Romanov.—p. 838.
Significance of Capillaroscopic Method of Investigation. Z. M. Melbard.—p. 844.
Musical Cardiac Murmurs. M. Yu Rapoport.—p. 849.
Recognition of Aortic Stenosis in the Living. B. P. Kushelevskiy, M. I. Glikin, D. M. Zislin.—p. 856.
Cardiac Pacemakers. E. I. Turbina-Shpuga and O. P. Chulkova.—p. 860.
Application of Physical Exercises to Cardiovascular Patients in Clinic. V. N. Moshkov.—p. 866.

Pathogenesis of Angina Pectoris.—Kudrin states that, of 500 instances of sclerosis of coronary arteries found by him on postmortem, only 50 offered a history of attacks of angina pectoris. These figures militate against the theory that coronary sclerosis is the direct cause of anginal attacks. On the other hand, the author points out that Neuberger found coronary sclerosis present in all of his thirty-three patients suffering from angina pectoris, Osler in thirteen out of seventeen (76.5 per cent), and Romberg in twenty out of twenty-eight (71 per cent). The author found in his postmortem studies frequent narrowing of the lumen of the coronary arteries and, at times, occlusion. Chronic aneurysm of the heart and an even greater incidence of sclerotic changes in the heart muscle, the result of thrombosis and infarction, were found. Cases which had a history of anginal attacks showed greater pathologic changes than those which did not have anginal symptoms. Narrowing of the lumen was found in 22 per cent of the cases presenting anginal attacks and in only 5 per cent of the remaining material. Coronary occlusion was found in 30 per cent of cases of stenocardia and in only 4.6 per cent of the remaining cases. Of all occlusions, 82.4 per cent involved the left coronary artery. Of these, 75 per cent were in the anterior descending branch. In six cases of thrombosis of the right coronary artery, myelomalacia was found four times in the left ventricle and not in the right. The author concludes that occlusion as well as narrowing of the coronary arteries bears a definite relation to angina pectoris. Sufficient evidence, however, does not exist to justify the belief of adherents of the coronary theory that the organic or functional narrowing or occlusion of coronary arteries is the direct cause of an attack of angina pectoris. That narrowing or occlusion of coronary arteries does not always cause attacks of angina pectoris is abundantly proved by postmortem studies. In the author's material, anginal symptoms were present in only eleven of thirty-four cases of coronary stenosis and in fifteen of thirty-six cases of coronary occlusion. A sudden ischemia, the result of infarction of the heart muscle, does not always cause pain. The author cites a case in which the patient was dying within one and one-half hours after the onset of circulatory symptoms not accompanied by anginal pain. Postmortem showed that death was due to coronary thrombosis with infarction and myelomalacia. Thus the coronary theory fails to explain why in some cases changes in the coronary arteries give rise to a painful anginal status while in others they do not. The same objections may be advanced against the aortic theory maintained by the Wenkebach school. The author leans to the theory that spasm of the heart muscle, rather than of the coronary artery, is the cause of the painful syndrome. In a special study of the heart muscle in fifty

cases of stenocardia and coronary sclerosis, he found degenerative parenchymatous changes, such as hyaline atrophy and fatty degeneration. A comparative study of the heart muscle of syphilitic patients who exhibited anginal attacks and of syphilitic patients who did not reveal a preponderance of myelomalacia in the former. Thus the well known rôle of syphilis as an etiologic factor in angina pectoris appears to be due to the pathologic process induced by it in the heart muscle. Irregularity in the sclerosing process of the coronary artery leads to irregularly distributed focal lesions in the myocardium. These may lead to focal functional disturbance of conductivity or irritability, to disturbance of coordination of the cardiac components and, thus, to local spasmodic contractions, the cause of painful sensations. Fatty degeneration of the myocardium may be caused by other conditions than coronary sclerosis; namely, by syphilitic virus, by anemias and by infections. Since the work of Leriche and that of Pletnev and Khesin, the rôle of the autonomic nervous system has come to be recognized as another important factor in the pathogenesis of angina pectoris.

Hospitalstidende, Copenhagen

76: 961-988 (Sept. 28) 1933

*Cutis Laxa: Two Cases. A. Reyn.—p. 961.
Diagnosis of Osteomalacia: Grave Case Cured by Vitamin D. P. Morville and P. Müller.—p. 970.
Complete Congenital Atrioventricular Block in Boy Aged 9. E. Gjørup. —p. 977.
Method for Measurement of Temperature in Short Wavelength Diathermy. K. Overgaard.—p. 983.
Course of Bartonella Infection in Rats After Ended Anemia. G. Alsted. —p. 984.

Cutis Laxa.—Reyn's cases were marked by changes in the collagenic connective tissue together with deficiency of subcutaneous tissue, and showed a tendency to hemorrhage in the skin and subcutaneous tissue. He says that dermatolysis probably depends on a malformation (mesodermal), in some cases originating on a hereditary basis, and appears mainly in men. Persons with this anomaly must seek occupations requiring little physical exertion and try to avoid all trauma.

76: 989-1016 (Oct. 5) 1933

*Some Experiences with Pyelography. J. V. Jørgensen.—p. 989.
Depressions Treated by a Liquid Preparation of Ergotamine Tartrate. Erna Christensen and P. Dickmeiss.—p. 1007.

Some Experiences with Pyelography.—On the basis of about 200 cases of pyelography, Jørgensen concludes that the procedure should consistently be followed in all disorders of the urinary tract and the pyelograms made in the expiratory phase. The ureteral catheter should not be present in the part of the urinary tract undergoing examination. The diagnosis of obstacles depends on (1) the difficulty experienced in bringing the contrast material injected from below past the obstacle and (2) the establishment of retention above the obstacle. Obstacles in the ureter may cause deficient excretion of intravenously introduced contrast substances by the kidneys which shortly before gave abundant diuresis. Improvement of the passage may lead to considerable (life-saving) increase in diuresis. The author affirms that the normal pelvis of the kidney is emptied of the contrast substance dissolved in water, within ten minutes.

Norsk Magasin for Laegevidenskapen, Oslo

94: 1193-1304 (Nov.) 1933

*Decerebration Rigidity and Gas Metabolism: Study on Nervous Factors in Regulation of Combustion. W. Hoffmann.—p. 1193.
*Esophagobronchial Fistula with Cancer Infiltration in Heart. J. Hald. —p. 1224.
Foreign Bodies in Digestive Tract: Large Number of Nails in Stomach Removed by Magnet. I. Moene.—p. 1229.
Foreign Bodies in Digestive Tract: Brief Review and Case. E. Thoresen.—p. 1241.
Pulmonary Abscess Treated with Pneumothorax: Case. B. Longva. —p. 1245.
Chronic Purulent Inflammation in Meibomian Glands Caused by Bacterium Mucosum-Capsulatum: Case. S. D. Henriksen.—p. 1248.

Decerebration Rigidity and Gas Metabolism.—Hoffmann found that the spontaneous variations in oxygen consumption in decerebrated cats, under fixed conditions of body temperature, position and duration of experiments, were within 6 per cent during one hour, with a tendency to continuous rise in some specimens. The carbon dioxide elimination, under the same conditions, varied within 10 per cent in one hour. The respiratory quotient showed a steady decline for hours. The oxygen consumption per kilogram of body weight in the individual specimens did not depend on the degree of hypertension. Extremely rigid specimens sometimes showed relatively low values, and vice versa. Section of the spinal nerves of the musculature of the extremities caused either no change or a slight increase in oxygen consumption.

Esophagobronchial Fistula with Cancer Infiltration in Heart.—Hald's patient was a woman, aged 56, who had been operated on for cancer of the uterus in January, 1928, and presented clinical symptoms of the heart and lungs since March, 1932. The roentgen diagnosis in September, 1932, was pleuritis on the left side and infiltration of the right lung, and the electrocardiogram showed paroxysmal auricular flutter. In February, 1933, the patient was admitted for treatment with the diagnosis of pulmonary abscess. Roentgen examination now revealed a clarification of two fingerbreadths upward from the hilus and esophageal stricture, with passage of the contrast gruel mainly into the left bronchus and the lung abscess. Witzel's fistula was made for feeding. Death occurred about a month later from heart failure. Necropsy showed the right lung to be large and edematous; the pleura on the left side was totally adherent and the left lung small, with a cavity of the size of an orange, partly filled with pus, and total destruction of the surrounding lung tissue. The cavity extended to the hilus, where a broad opening connected with the left bronchus. In the esophageal constriction a large ulceration opened into the left bronchus just above the opening into the lung abscess. The wall of the lung abscess infiltrated the pericardium, passing through it into the left auricle, the wall of which was a thick tumor infiltrate. A large papillomatous tumor partly filled the auricle and infiltrated the left pulmonary artery in the hilus. The author considers this a case of cancer metastasis, related to the uterine cancer, with cancer both in the lung and in the lymph nodes. As the left pulmonary artery was stopped only by small, dry thrombus masses, the absence of a fatal hemorrhage is regarded as surprising.

Ugeskrift for Læger, Copenhagen

95: 1207-1234 (Nov. 9) 1933

*Facial Hemiatrophy—Vitiligo—Myxedema. K. Faber.—p. 1207.
Bernardino Ramazzini, Father of Occupational Hygiene: On Occasion of 300th Anniversary of Birth. K. Roholm.—p. 1211.
Empyema Trocar. O. K. Svenningsen.—p. 1216.

Facial Hemiatrophy — Vitiligo — Myxedema. — These three disorders developed one after another in a woman, now aged 55, having tardy congenital syphilis presumably cured. Faber sees a close connection between the facial hemiatrophy, which appeared in childhood, and the universal pigmentation anomaly with pigmentation of the face, which set in during the third decade of her life, and ascribes to both a central origin with the starting point in the centers of the sympathetic or autonomic nervous system. The myxedema, which appeared more than twenty years after the vitiligo, seems to him, in view of the close relation between the autonomic nervous system and the endocrine glands, probably not an accidental coincidence but dependent on a deeper, common cause. The hereditary syphilis is thought to have affected the trophic centers as a weakening, predisposing factor, the definite cause of the three disorders being the pronounced psychic disturbances which have influenced the patient throughout her life.

95: 1235-1256 (Nov. 16) 1933

*Remarks on Preliminary Test in Choice of Donor for Transfusion. O. Thomsen.—p. 1235.
Modification of Extension Treatment in Fractures in Fingers and Metacarpus (Toes and Metatarsus). A. K. Christoffersen.—p. 1239.
Some Auto-Observations During Thrombophlebitis. E. Dujardin.—p. 1240.

Choice of Donor for Transfusion.—In the choice of suitable donors for transfusion, Thomsen proposes to institute a preliminary test primarily based on the direct determination of whether the transferred blood will be hemolyzed or not, which is, he says, the most important determination for the course of the transfusion. The question whether so-called universal donors (type O) are more or less suited will also be answered by the outcome of the test.